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FEBRUARY 1952

The Paper Industry

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SIAMESE

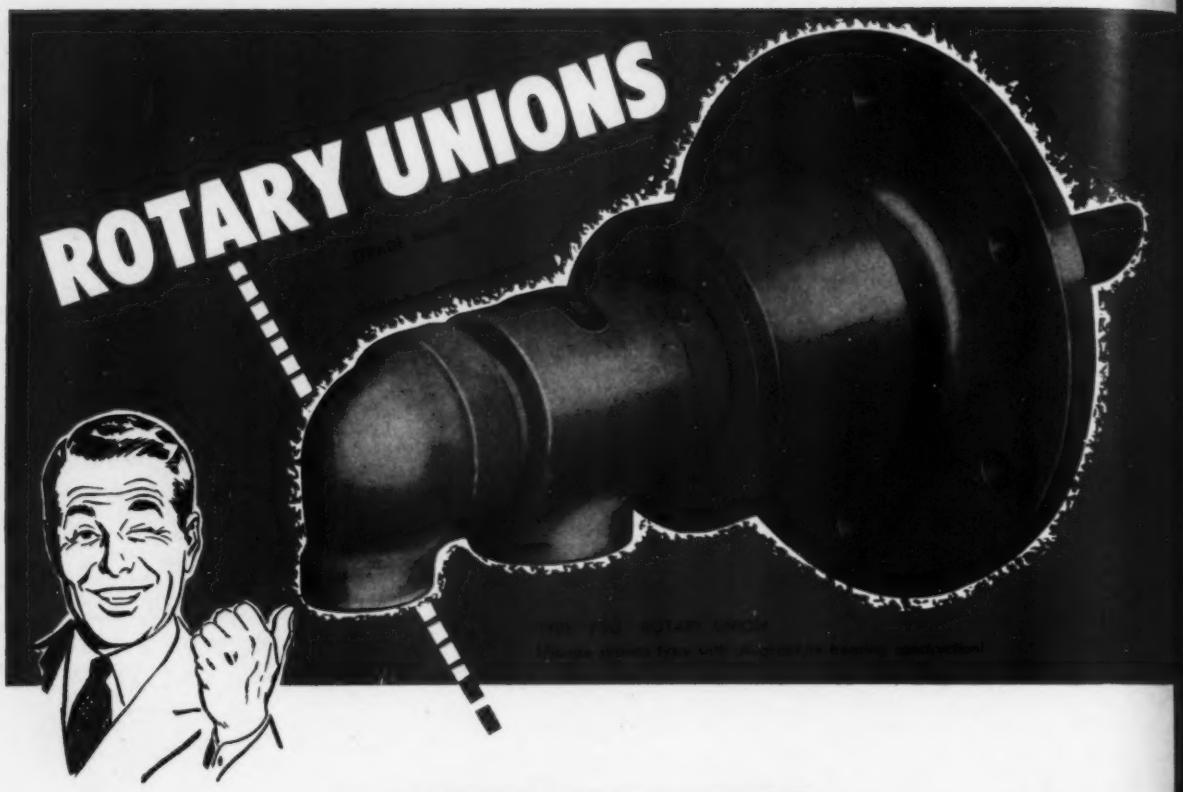
for faster

uniform drying

WILLIAM L. BARRELL COMPANY

2 CHAUNCY ST., • BOSTON, MASS.

• *Siamese and Tour Boss Dryer Felts* •



3 Years . . . without a drip

Many ROTARY UNIONS have been in service on dryers, calenders, and digesters for 3 years and longer without even the slightest loss of sealing efficiency and *without ever having been touched by a wrench* since installation.

SMOOTH SEALING FOR OVER 18 YEARS

The Type "FSG" ROTARY UNION, shown here, was designed for continuous heavy duty, high pressure, high speed, and high temperature service on revolving paper mill drying equipment. The two-point syphon support of this Type "FSG" ROTARY UNION assures better alignment of the syphon pipe, prevents wearing-through and falling-off of syphon pipes, and eliminates excessive strain on syphon pipe threads. Other models are available for any sealing job where revolving shafts or drums require heating or cooling. Our own sales engineers will be glad to discuss these sealing problems. Call our nearest office, or see our advertisement in PAPER AND PULP MILL CATALOG, or write to our Department 2P.

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SAVED in 10 months!

Photo courtesy of
St. Joe Paper Company

Six of these wood piles were saved between March and December, 1950 by a large kraft mill in the South. Actually, the mill saved more than that—a total of 26,200 cords. With this tremendous saving in wood went an appreciable increase in pulp quality. These results were obtained simply by installing a Sutherland High Yield System.

This is conservation where it really counts—in the *growing* tree—and a potent factor in the progress of the pulp and paper industry.

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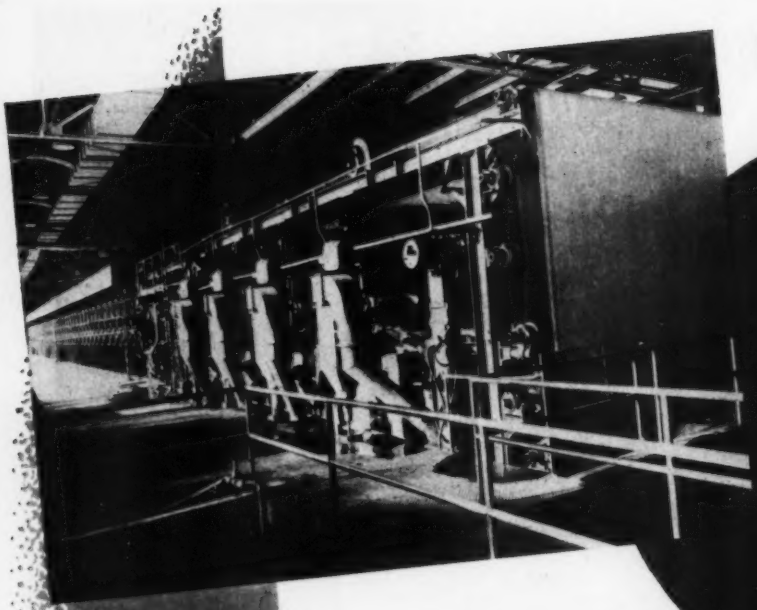
continuous beating systems

Designed, Engineered, Serviced

***by* SUTHERLAND REFINER CORPORATION**

TRENTON 8, N. J.



Alton's No. 3 machine, world's record strawboard producer. Photo courtesy of Alton Box Board Company, Alton, Illinois.

3-WAY SERVICE

at Alton Box [illegible]ny

HERE are the three water treatment services performed by Nalco at Alton Box Board Company, Alton, Illinois. In addition, experimental work on process waters using Nalco anti-foam chemicals is now being done at Alton:

❶ SLIME CONTROL chemicals, fitted to Alton Box Board requirements, help maintain high quality . . . prevent slime spots and breaks due to slime.

❷ CLARIFICATION of mill water with Nalco #680 Sodium Aluminate . . . A versatile chemical also used widely for size control and maximum alum availability.

❸ BOILER WATER TREATMENT with specially-processed organic chemicals for use in high-capacity, high-pressure boilers.

Use of Nalco Chemicals and Services at Alton Box Board Company shows clearly the wide extent to which good water treatment, properly applied, can be utilized to make over-all mill operation cleaner, more efficient and more economical.

The Nalco System can be applied selectively, or for complete water treatment protection in *your* mill. Write today for full details on your specific water treatment problems.

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6232 West 66th Place
Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

THE *Nalco* SYSTEM • Serving the Paper Industry through Practical Applied Science

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 33 • NUMBER 11 • FEBRUARY, 1952

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THE PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index**. An index to each volume is issued annually by the publisher as a part of the April number.

Copyright 1952, by Fritz Publications, Inc.

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

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THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 404 North Wesley Avenue, Mount Morris, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

Member: Audit Bureau of Circulations, The Associated Business Publications.

Entered as second class matter December 13, 1948, at the post office at Mount Morris, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U. S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

Three

waste water problems solved by

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REACTIVATOR

The Lowe Paper Company of Ridgefield, N. J., had a particularly difficult problem of high solids in their de-inking waste water.

3000 Gpm of waste water are to be handled, containing up to 1500 ppm of suspended solids. The problems were:

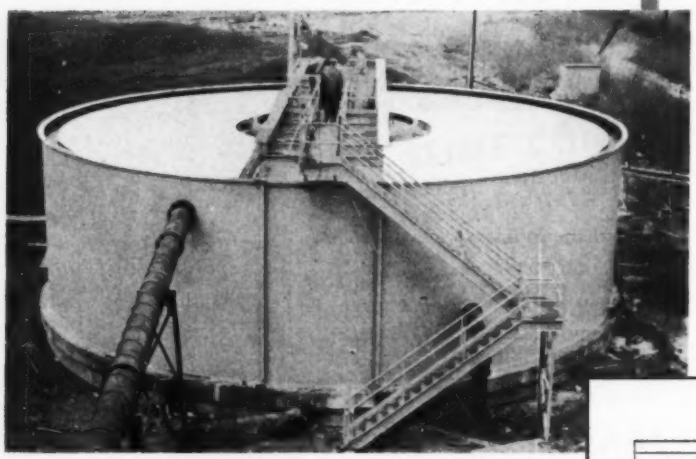
(1) to prevent stream pollution,

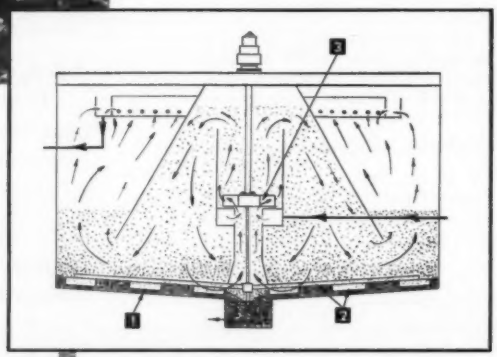
(2) to produce sludge solids of the highest concentration,

(3) to recover the water for reuse in the system.

After investigating all available designs and with the approval of Gilbert Associates, the engineering consultants employed by the company, a Graver Reactivator was selected to solve this multiple problem. The Reactivator installation does the job so effectively that it delivers solids up to 14 per cent by weight to the drying beds while producing an effluent suitably clear for recycling in the washing system, *without any chemical treatment.*

The Graver Reactivator assures these results and will solve *your* heavy duty liquid clarifying problem. Its distinctive design is described in Bulletin WC-103. Write today for your copy and ask for advice on your water treatment problem without obligation.





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1. *Full bottom area for solids concentration and collection.*
2. *Separately driven highly efficient sludge scraper and blades.*
3. *Positive and intimate contact of incoming water with sludge by variable speed sludge recirculation impeller.*

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GRAVER

GW 456

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The advanced Fawick Airflex CB Clutch with ventilating adapter which creates forced air circulation through the entire unit for efficient heat dissipation.

COOLER CLUTCH OPERATION . . .

The ventilating adapter insures cooler clutch operation and more dependable sectional drive performance by eliminating excess wear—providing long, trouble-free operating life. The maximum ventilation made possible with Fawick is particularly advantageous in fulfilling inching requirements of the Dryer Section.

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The shock-absorbing flexibility of the torque-transmitting rubber and cord tube, plus the 360° constant-velocity contact with the friction surface provide unmatched smoothness and dependable clutch operation.

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The simple rugged design automatically compensates for operating wear. This insures "new clutch" action at all times.

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The elimination of operating linkage, adjustments, and lubrication make Fawick unparalleled in low maintenance cost.

These and many other Fawick advantages will insure more efficient operation of your paper mill machinery—they add up to the BEST Clutch for your machines—FAWICK AIRFLEX.

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For further information on Fawick Industrial Clutch and Brake Units, write to the Main Office, Cleveland, Ohio, for Bulletin ML-22.

FAWICK Airflex
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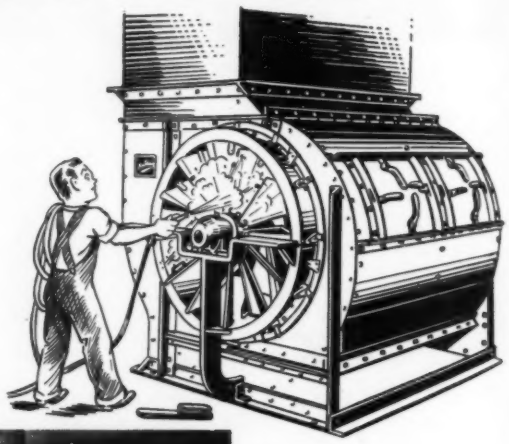
"Buffalo" *Tips on Getting the Best Service from your* **Fans**

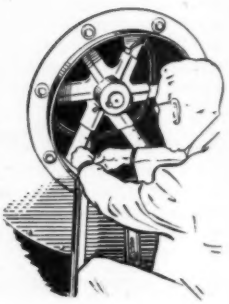
REGULAR CLEANING PREVENTS DIRT FROM UNBALANCING FAN ROTORS

When a little dirt collects on a fan blade, more dust, dirt and grease will lodge there. Eventually, this can unbalance the entire rotor, gradually affecting fan performance and causing vibration which could burn out bearings, spring shaft and loosen the foundation. Periodic cleaning by wire brush, scraper or compressed air as shown at right can head off these troubles. "Buffalo" rotors are balanced at our factory by modern precision equipment, and if kept clean, should remain so indefinitely to give you vibrationless performance.

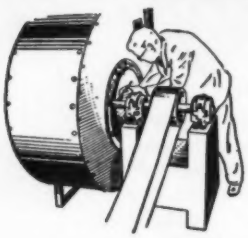


Far left, balancing fan wheels at the "Buffalo" factory

Left, a "Buffalo" Double Width Induced Draft Fan



HAND-BALANCING A ROTOR BY CHALKING SHAFT



Clean shaft. Run fan up to speed. Hold point of sharpened chalk stick so that it just touches shaft. This will scribe a line on the shaft—the shorter the line, the greater the unbalance. Have U-shaped weights ready for trial balancing.

Place a trial weight on heel of blade 180 deg. away from chalk mark. Repeat test runs with varying weights until a line is made all around the shaft; then the wheel is in balance. A complete instruction booklet is yours on request, describing the procedure in detail.

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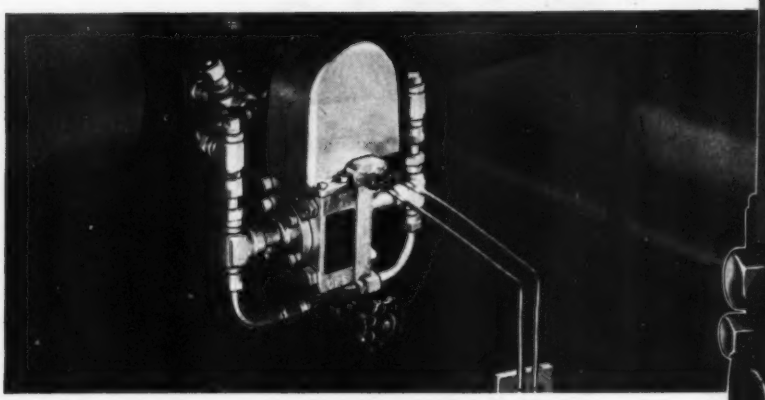

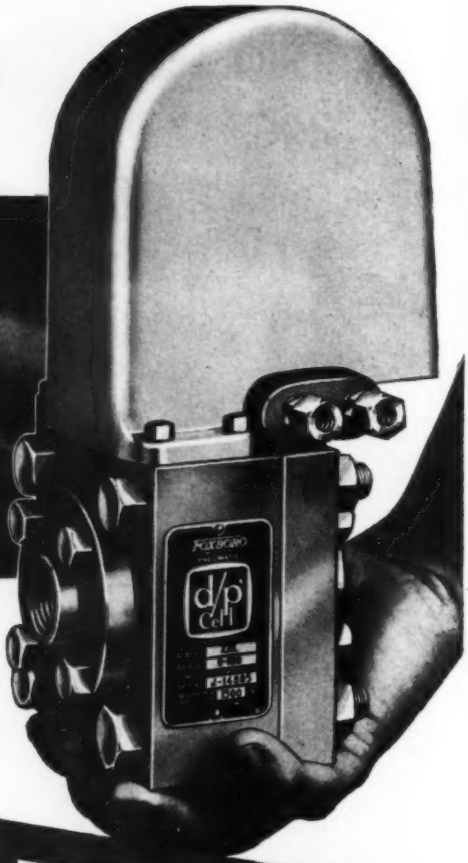

. . . gives fastest response, longest sustained accuracy, lowest installation cost

Simpler in design, simpler and much less expensive to install, far easier to maintain . . . the all-metal Foxboro mercury-less d/p Cell offers greater speed of response, permitting closer flow control, than has ever been possible before. Its negligible displacement and corrosion-proof construction of Type 316 Stainless Steel eliminate usual maintenance problems, even in service on highly corrosive or viscous fluids previously considered unmeasurable.

The Foxboro d/p Cell measures differential pressure by the force-balance principle and transmits pneumatically to indicating, recording, or controlling receivers. Small, compact, weighs as little as 19 lb. Ranges: from 25" to 800" H_2O. Working pressure ratings up to 4000 psi. Steel or stainless steel construction. Inherent over-range protection. Easy in-the-field calibration and range changes. Optionally available with pre-assembled manifold piping shown in photo above.

Thousands of d/p Cells now in use throughout industry, with many repeat orders now on our books, indicate the wide acceptance and successful performance of this revolutionary development for the measurement of liquid, steam, gas, or air flow. Write for detailed Bulletin 420. **The Foxboro Company, 1582 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

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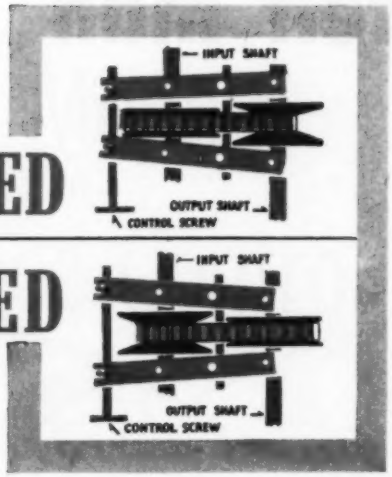

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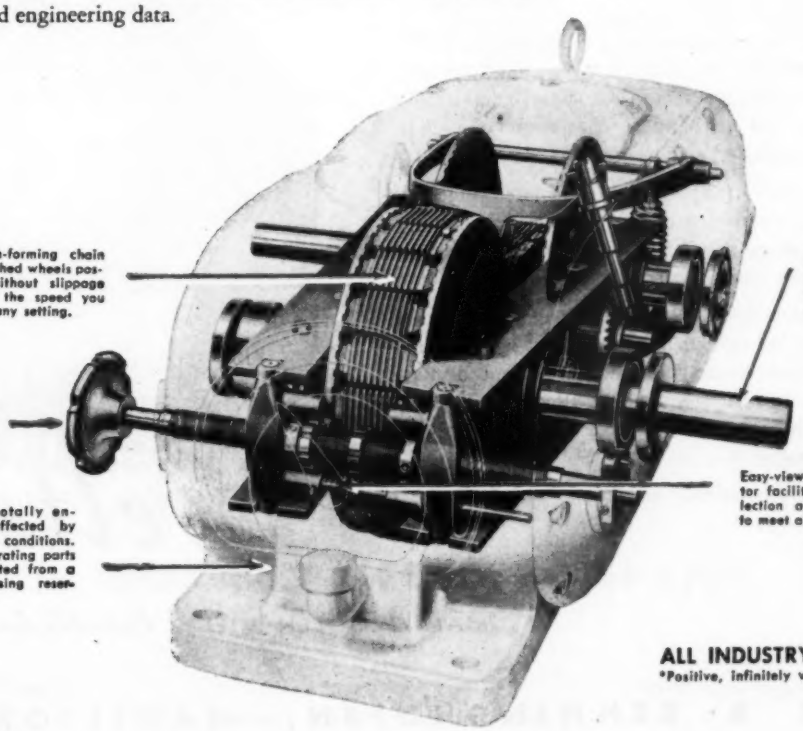

Self-tooth-forming chain grips toothed wheels positively without slippage — gives the speed you need at any setting.

You can get minute speed changes and maintain them accurately while operating under full load.

An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

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*Positive, infinitely variable

Consult your felt man

...before you change the speed of your machine

Every felt is manufactured to give maximum service at a pre-determined rate of speed. If you run faster than that, you automatically reduce the effectiveness of the felt and leave too much water to be evaporated at the drier rolls. Run slower and your costs per ton go up.

Right now your principal job is to increase your daily tonnage. This means that more water must pass through the meshes of your felts before the sheets go to the driers. But you can't overlook fine finish.

Here is where you need the advice of the Hamilton Felt man. He has more than 300 different styles to draw from. He knows from experience which one of these felts will be best for you. And he also knows that you will hold him responsible for the performance of the felt he recommends.

He is a safe man to talk to.

From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.

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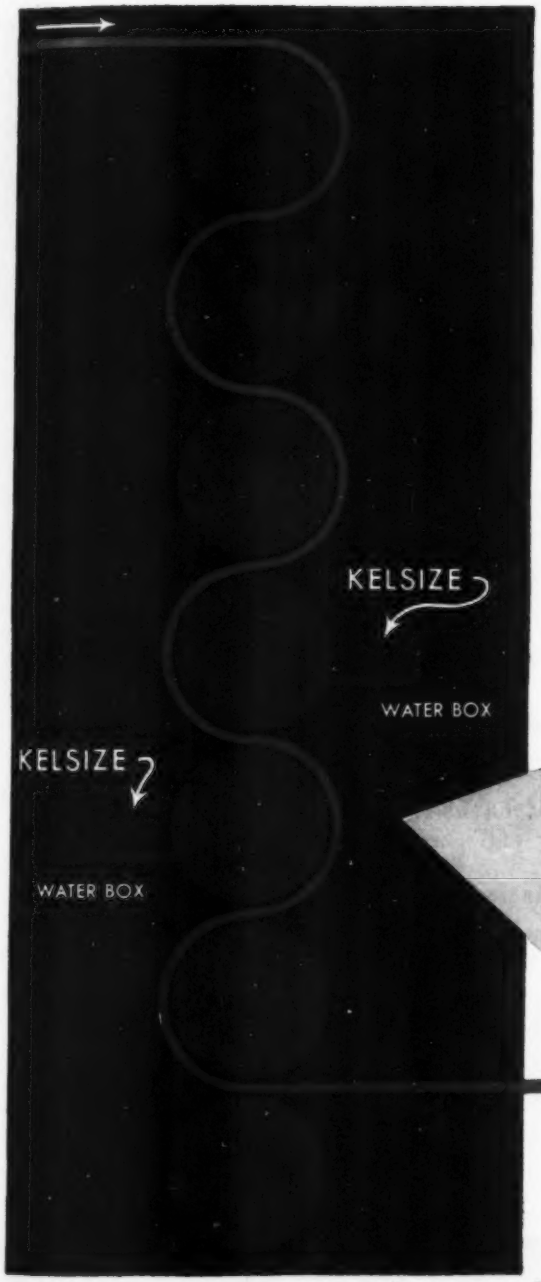
the Modern Surface Control Agent



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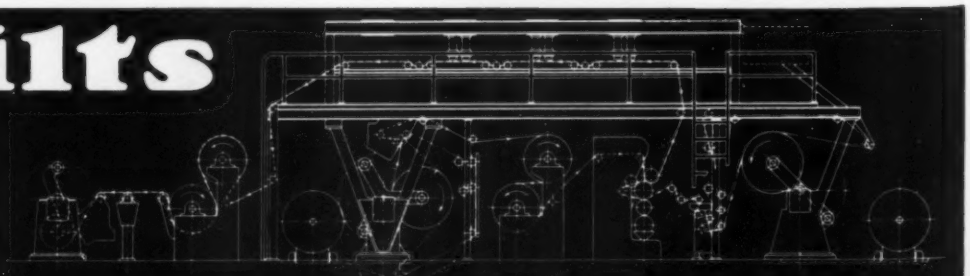

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Appleton woolen mills

APPLETON, WISCONSIN

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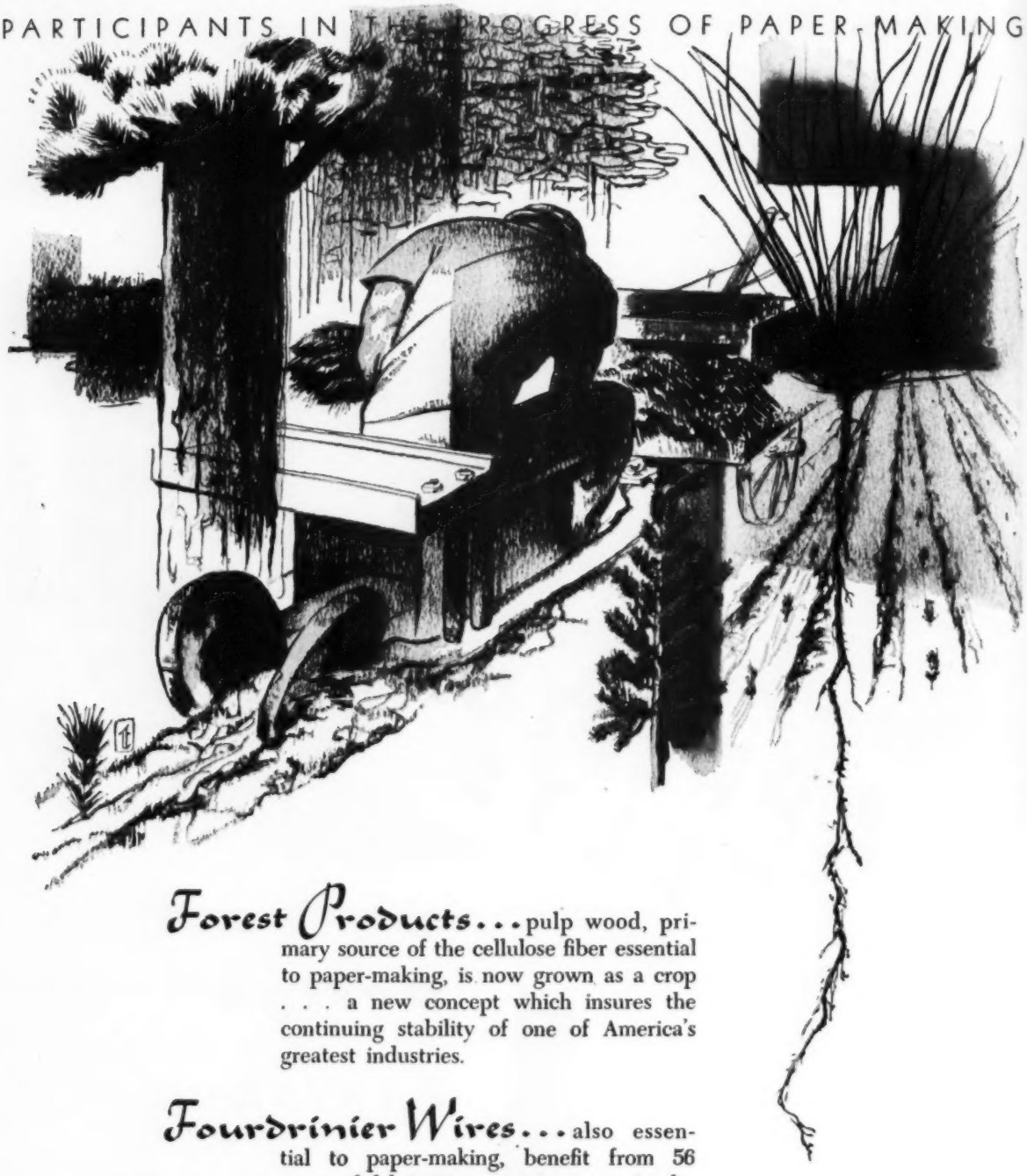

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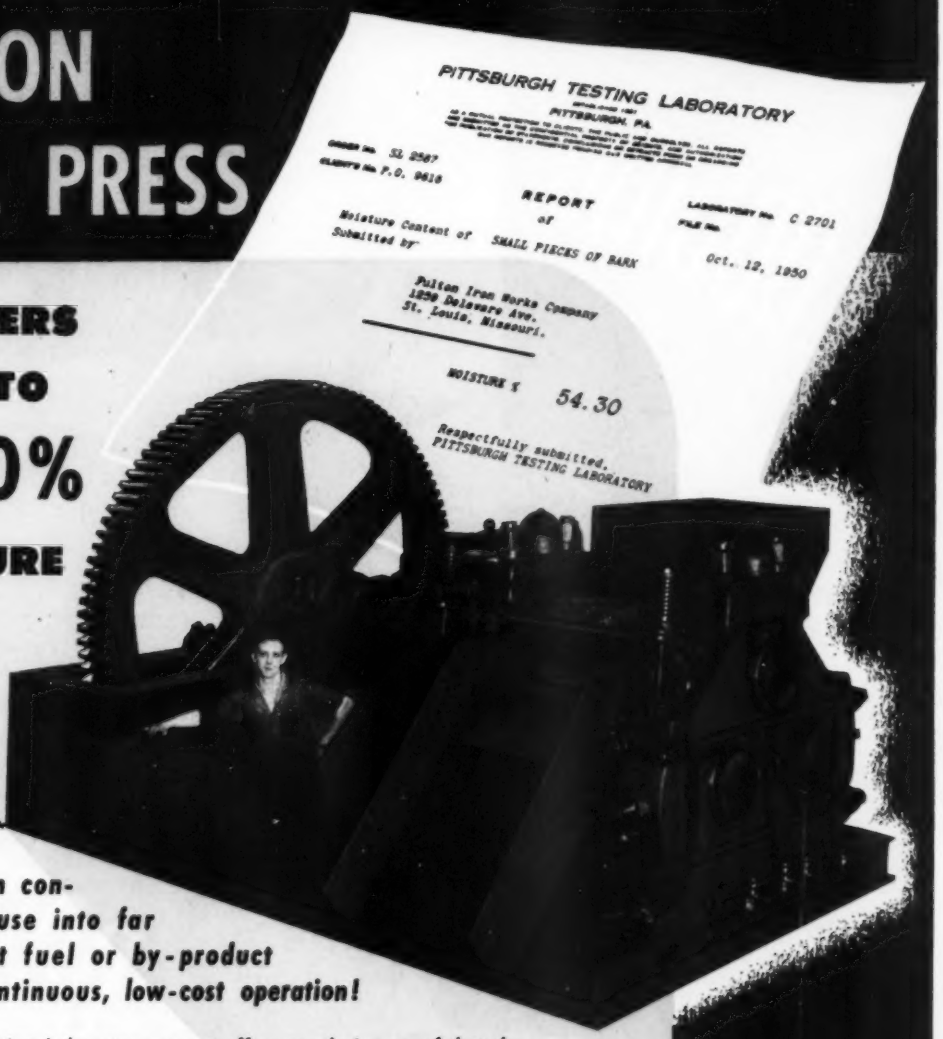
PITTSBURGH TESTING LABORATORY
PITTSBURGH, PA.

REPORT
of
Moisture Content of SMALL PIECES OF BARK
Submitted by
Oct. 12, 1950

Fulton Iron Works Company
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St. Louis, Missouri.

MOISTURE % 54.30

Respectfully submitted,
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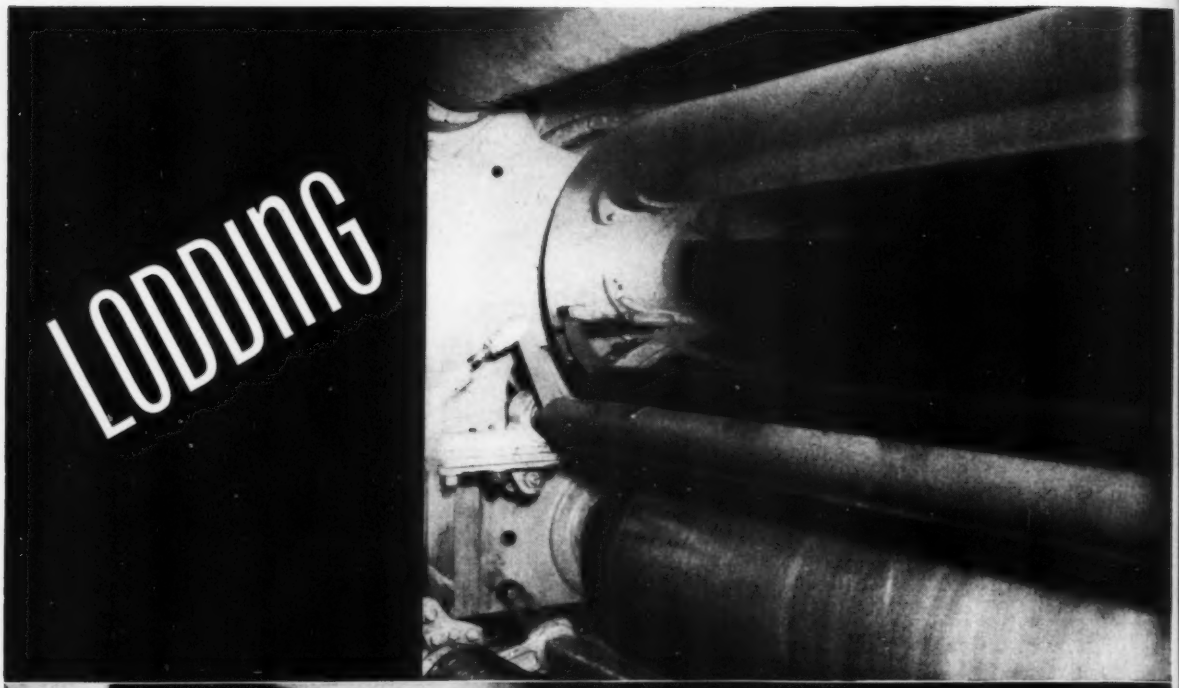

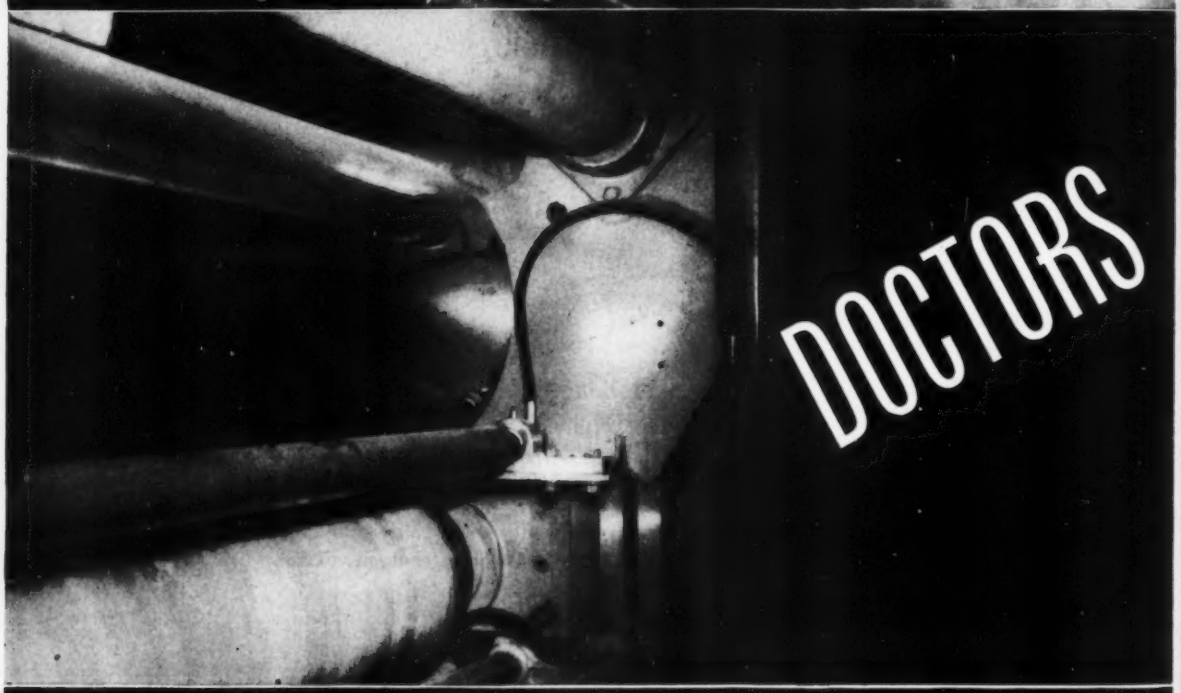

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GENERAL CHEMICAL Phosphates

For Many Purposes

For making soap, soap powder, synthetic detergents
For textile scouring
For treating oil well drilling muds
For making cleaning compounds, scouring powders
In boiler water compounds
In coating paper and de-inking
For paint removers
For metal cleaning
For stabilizing textile peroxide bleaches
For making cold-water paints, pigments
In manufacture of pharmaceuticals
In manufacture of ceramic ware

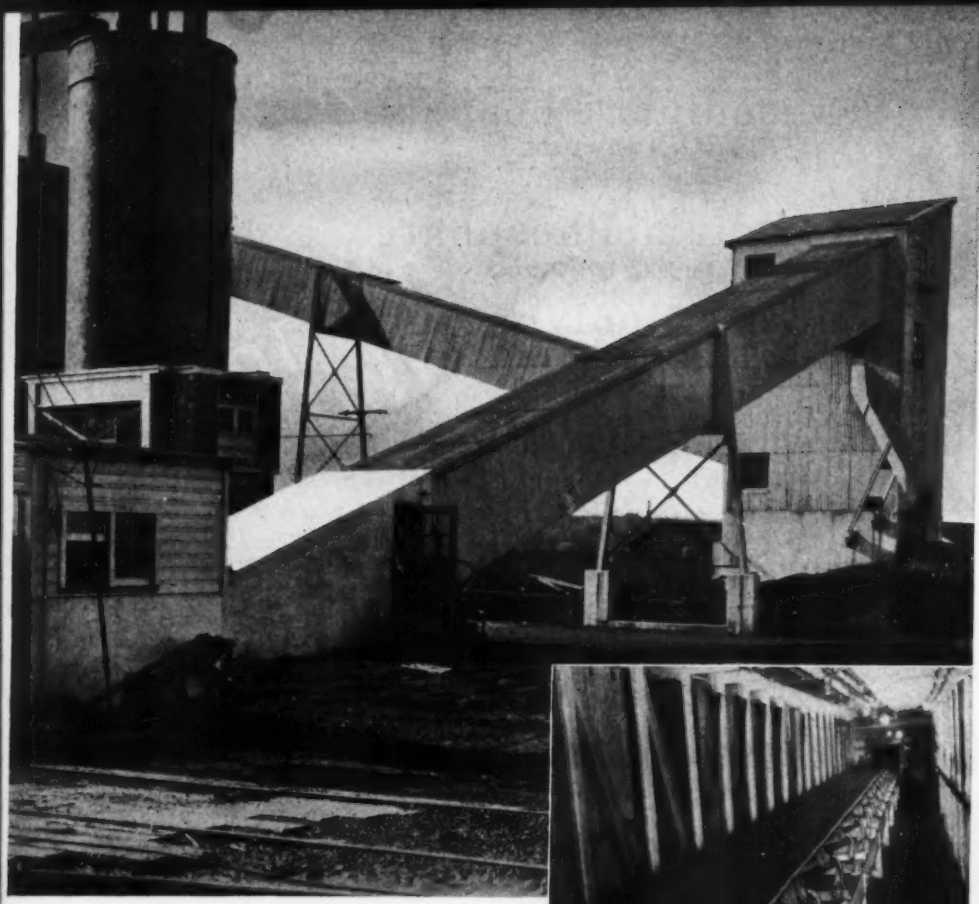
General Chemical pioneered in the manufacture of "wet process" phosphates over a half century ago. Out of its early work, the Company has developed specialized modern production techniques by which phosphates of highest quality and purity are being made to meet every industrial requirement.

Today, these techniques are enabling the Company to maintain peak outputs of the key phosphates listed here, independent of defense demands for elemental phosphorus and electrical power.

For your requirements, consult the General Chemical office serving you. Stocks are readily available from coast-to-coast distributing points.

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo Charlotte • Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston Jacksonville • Kalamazoo • Los Angeles • Minneapolis • New York • Philadelphia Pittsburgh • Providence • St. Louis • San Francisco • Seattle • Yakima (Wash.)
In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



Starts fast at forty below...

This belt conveyor carries coal from railroad cars to overhead hoppers for a power company located in the northern part of the Midwest . . . so far north that temperatures frequently hit forty below zero. Starting the conveyor in that kind of weather meant lost time, wasted manpower. The bearing lubricant became so stiff that five or six men often were required to pull on the belt. Three hours a day frequently were lost in getting the unit in operation.

As many as a dozen conventional lubricants were tried without success before a change to STANOLITH Grease No. 42 was made on the recommendation of a Standard Oil lubrication specialist. None could match the ability of STANOLITH to provide easy starting at extreme low temperatures, and still maintain effective lubrication during high summer temperatures.

STANOLITH Greases are filling the bill in a wide range of industrial and processing applications because of their resistance to heat and to the washing action of water, and their ability to flow readily under wide variations in temperature. A Standard Oil lubrication specialist can help you take advantage of these special properties. A call to your local Standard Oil Company office is all that's necessary. Or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANOLITH
TRADE MARK
Greases

What's your problem?

Meet R. R. Rowlands, of Stan ard's La Crosse office. He is the l brication specialist who work with this power company to fi the right grease for an especial tough job. And as a result of h work, the company was able save considerable time in the o eration of a coal conveyor.

His on-the-job service is typ cal of that available to all mi west plants through a corps c such lubrication specialists. Yo can be sure that the specialist your own area has both the pra tical experience and the trainin in a Standard Oil Lubrication E gineering School that will resu in dependable, thorough assis ance.

Why not call your local Stan ard Oil Company office today Put a lubrication specialist t work on your problem now When he calls, be sure to discu the advantages and performanc records of these outstandin products:

STANOIL Industrial Oils—This mu ti-purpose line of oils provide cleaner operation of hydraulic unit supplies effective lubrication in a compressors, gear cases, and circu lating systems. One or two grade can replace a wide variety of spe cial oils and lubricants.

CALUMET Viscous Lubricants—Thes greases strongly resist washing an throw-off. Their superior wet ting ability affords better coat ing of open gears and chains better internal lubricatio of wire ropes.

STANDARD OIL COMPANY STANDARD (*Indiana*)

Industry looks to
Powell for the latest
in valve design
When new methods and processes create new flow control conditions, Powell is always ready with valves of correct design and materials to meet them.
That is why there are more kinds of Powell valves in service today than any other make.
The Wm. Powell Co.
Cincinnati 22, Ohio
Fig. 3003
300-pound, Cast Steel,
O. S. & Y. Gate Valve
with flanged ends.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846

WYANDOTTE
CHEMICALS
Wyandotte Chemicals skilled Technical Service staff is ready to go to work for you in the application of PURECAL M to your coating process, as described here.

Press sheet with Purecal M in coating medium is inspected by Bruce Bivens

How can Wyandotte Purecal M help you sell more offset paper?

Bruce Bivens, lithographer, stresses the importance of whiteness and quick drying in offset printing.

"Every time I'm asked to get a lot of snap in a job, I say, 'Give me a white-white sheet and I'll make it sparkle,' " reports Bruce Bivens, superintendent of the Calvert Lithographing Company, one of the nation's large lithographing plants.

"Of course, that sheet needs a uniform surface. It must also take ink well and dry quickly. I find that many papers which have proved particularly satisfactory on all four counts have PURECAL M in the coating medium."

To paper makers

Wyandotte PURECAL* M is a pigment of highest purity for paper coating. It is ultra-uniform in quality and particle size, free of grit and other abrasives, readily and easily dispersed in water. These characteristics insure a uniform, smooth coating of high whiteness and hiding power and maximum production rates.

What to do

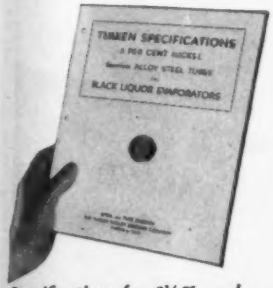
If you are using PURECAL M in your coated papers, see that your sales force has these facts as sales ammunition. If you are not using it, write for complete information on its properties and applications. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in Principal Cities.*

*Trademark

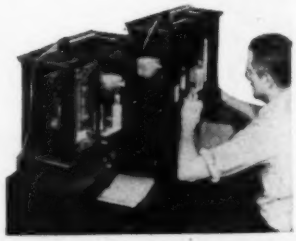
Wyandotte CHEMICALS

No need to guess when you buy evaporator tubes!

The Timken Company shows you what you get

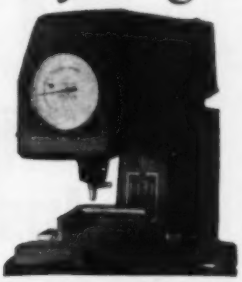


Specifications for 3½% and 5% nickel tubes are available to you with no obligation



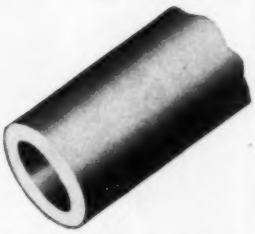
Special chemical composition test of each lot is made at your request.

In flaring test, tube I. D. must expand 20% without cracking or showing flaws.



Tubes must have Rockwell hardness number not exceeding B89.

Each tube tested under hydrostatic pressure of 1,000 p.s.i. before shipment.



Tubes must be free from defects and have workmanlike finish. Inspection is rigid.

Tolerances in O.D., wall thickness, cut length are held to a minimum.

Purchaser has free entry to plant for inspection of work on contract.

...and guarantees you'll get it!

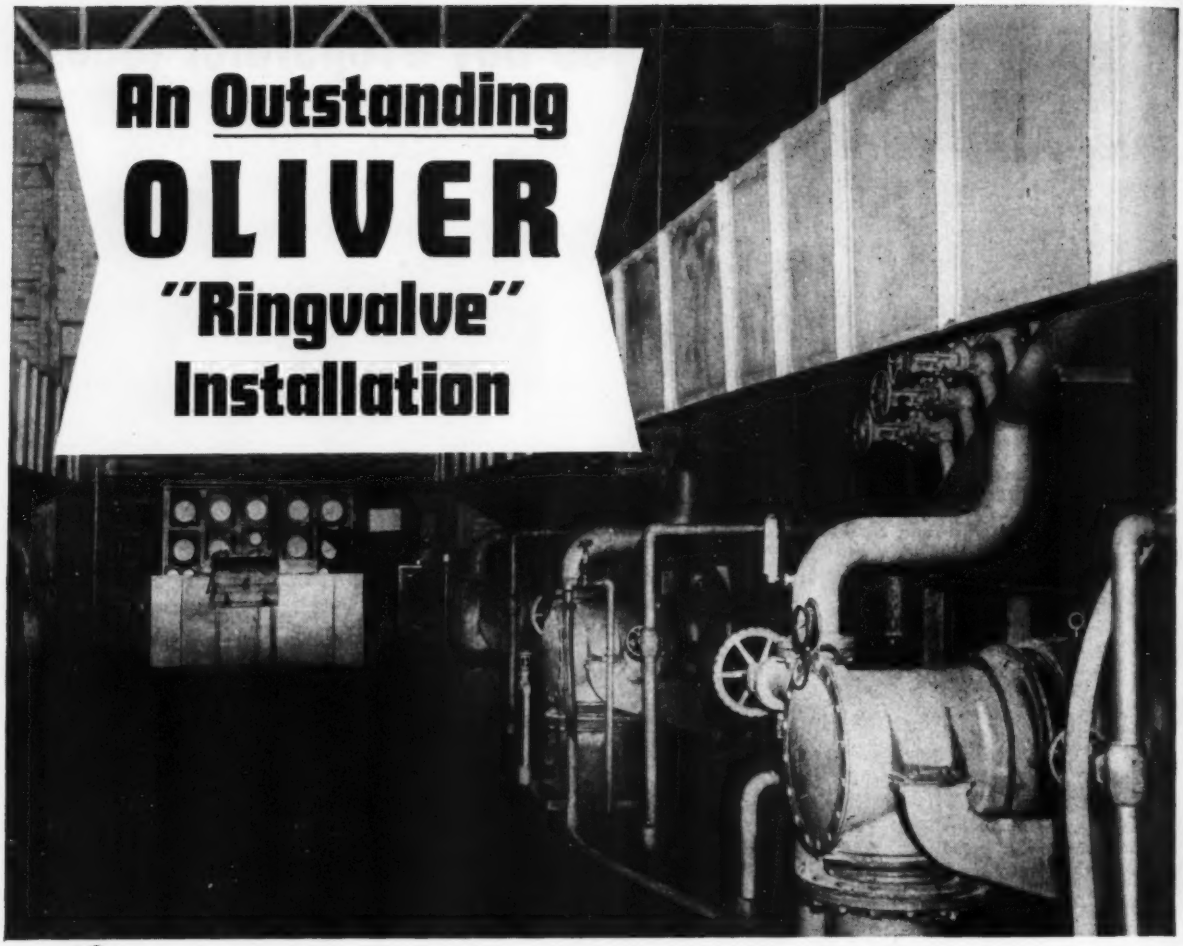
NOW you can buy 3½% and 5% nickel black liquor evaporator tubes and know exactly what you're getting. Specifications published by the Timken Company cover essential points such as physical properties, chemical composition and tests to which the tubes are subjected (see above). And the Timken Company *guarantees* that every lot of 3½% and 5% nickel evaporator tubes will meet these specifications. Quality is rigidly controlled at every manufacturing step and exhaustive tests are conducted before shipment. As a result, you can be *sure* of maximum tube life per dollar.

Many companies using Timken® steel evaporator tubes report lower tube replacement costs, less tube sheet wear and reduced downtime. Write for your copy of 3½% and 5% nickel tube specifications today. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

An Outstanding OLIVER "Ringvalve" Installation



It's at Brunswick, Georgia, where one of the country's best 3-stage washing plus rewash systems on kraft brownstock is at work.

And the washing is being done on two lines of Oliver Ringvalve Washers, providing a new washing system for a well known company, long in business.

You've guessed it. We're referring to the new, modern kraft brownstock wash room of the Brunswick Pulp & Paper Company. That Oliver Ringvale Washers were selected to be key equipment in this company's modernization program is, naturally, very gratifying.

Believing the management would be willing to have others in pulp and paper manufacturing go through this new wash room, we suggest that if you are in the neighborhood, drop in and see the Oliver Ringvalves at work. You will get an excellent picture of the efficient way these washers are serving your industry, particularly in the States and Canada.

New York 18 — 33 W. 42nd St. Chicago 1 — 221 N. LaSalle St.
Oakland 1 — 2900 Glascock St. San Francisco 11 — 260 Calif. St.
Export Sales Office — New York • Cable — OLIUNIFILT

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OLIVER UNITED FILTERS INC.

WORLD WIDE SALES, SERVICE AND MANUFACTURING FACILITIES

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Oliver United Filters Inc.
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INDIA
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EUROPE & NORTH AFRICA
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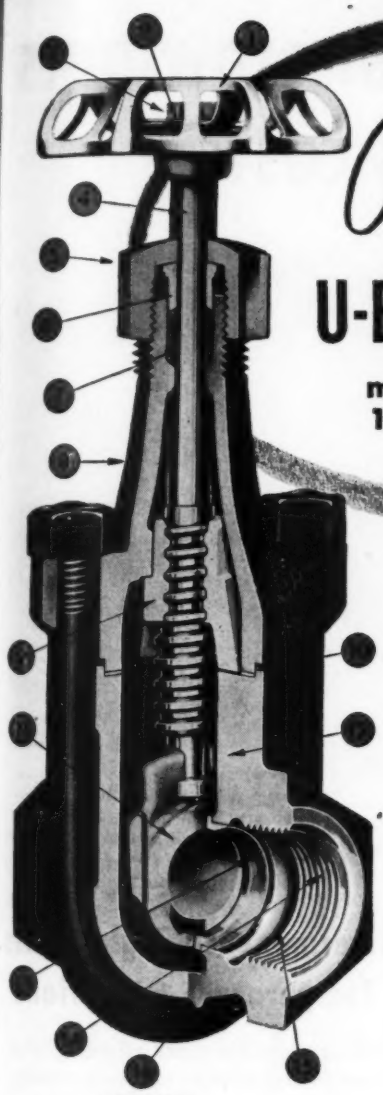
Melbourne

SOUTH AFRICA
E. L. Bateman Pty., Ltd.
Johannesburg, Transvaal

Only Jenkins U-BOLT GATES

measure up to this 16-point standard

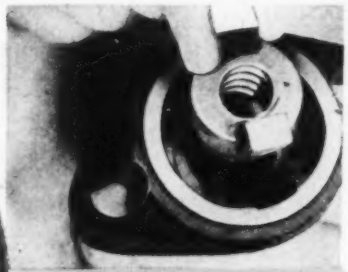


1. Perfect-Grip Handwheel
2. Valve Index Plate
3. Secure Wheel Nut
4. Heavy Manganese Bronze Spindle
5. Large Packing Nut
6. Self-centering Packing Gland
7. Deep Stuffing Box
8. Heavy Duty Bonnet
9. Unique Renewable Bonnet-Saver Bushing
10. Body-Bonnet Safety Joint
11. Extra-Wide Gauge Reversible Bronze Wedge
12. Heavy-Duty Body
13. Bronze Seat Rings, Expanded in
14. Full Length Pipe Threads
15. Liberal Diaphragm Clearance
16. Strong U-Bolt

PRESSURES

Screwed	Flanged
150 lbs. Steam	125 lbs. Steam
225 lbs. O.W.G.	175 lbs. O.W.G.

Bronze Mounted or All Iron—Sizes ¼" to 3"



BONNET SAVER BUSHING — No need to junk the bonnet when operating threads are worn. Just slip in a new, patented "Bonnet-Saver Bushing" and have good-as-new thread engagement.

EASY TO CLEAN — You can really get into the bonnet of this valve to clean out the chamber above the operating threads.

RUGGED CONSTRUCTION — Here's proof. When the U-bolt nut was tightened down with a 14" socket wrench until the high tensile steel bolt broke, the heavy duty body and bonnet did not crack!

TROUBLE IS RULED OUT! Check these 16 advanced features—for wear-resistance . . . for ease of maintenance. From handwheel to diaphragm, notice how thoroughly trouble has been ruled out in designing this U-bolt valve. No other valve in its class measures up to Jenkins U-bolt Gate on all these points, many of them exclusive.

You can take it apart and put it together again in two minutes, and it's a cinch to clean. When operating threads become worn, just slip in a new "Bonnet Saver Bushing" and restore it to new-valve efficiency. It's a favorite for those plumbing-heating, mine, mill or any services where excessive sediment is tough on valves and where freezing is a hazard.

For "renewability" without waste, bull-necked endurance, and low upkeep cost, you can't beat Jenkins U-bolt Valves. Yet they cost no more! Full details and specifications in new circular, Form 179-B. Jenkins Bros., 100 Park Avenue, New York 17. Jenkins Bros. Ltd., Montreal.

Sold through leading Industrial Distributors

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

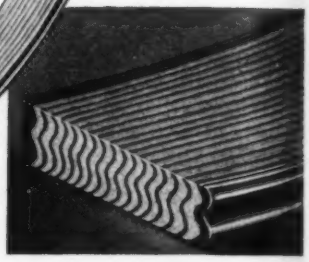
SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

MAXIMUM PROTECTION AGAINST BLOW-OUTS *plus* LOWER OPERATING COSTS

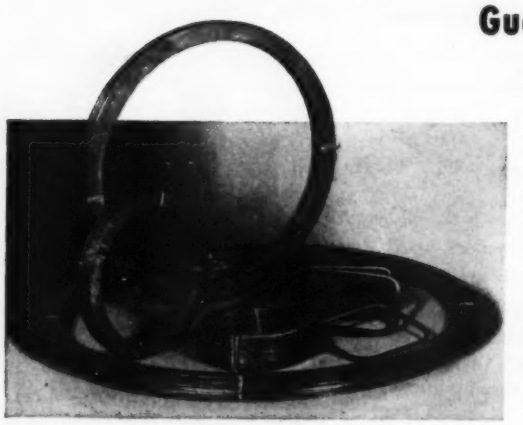
with

GUARDIAN* GASKETS



Cross section view of the GUARDIAN gasket shows its unique and rugged construction—alternate layers of strip metal and asbestos. The inner and outer edges are reinforced with double thicknesses of metal.

Guardians Maintain Permanently Tight Joints Under Changing Temperature Conditions



Guardian gaskets are made in round, oval, square, flatside, diamond, and pear shapes. They are furnished in a wide range of sizes for pipe flanges, boilers and other equipment. For raised face pipe flanges, Guardian gaskets with metal centering rings are recommended.

*REG. U. S. PAT. OFF.

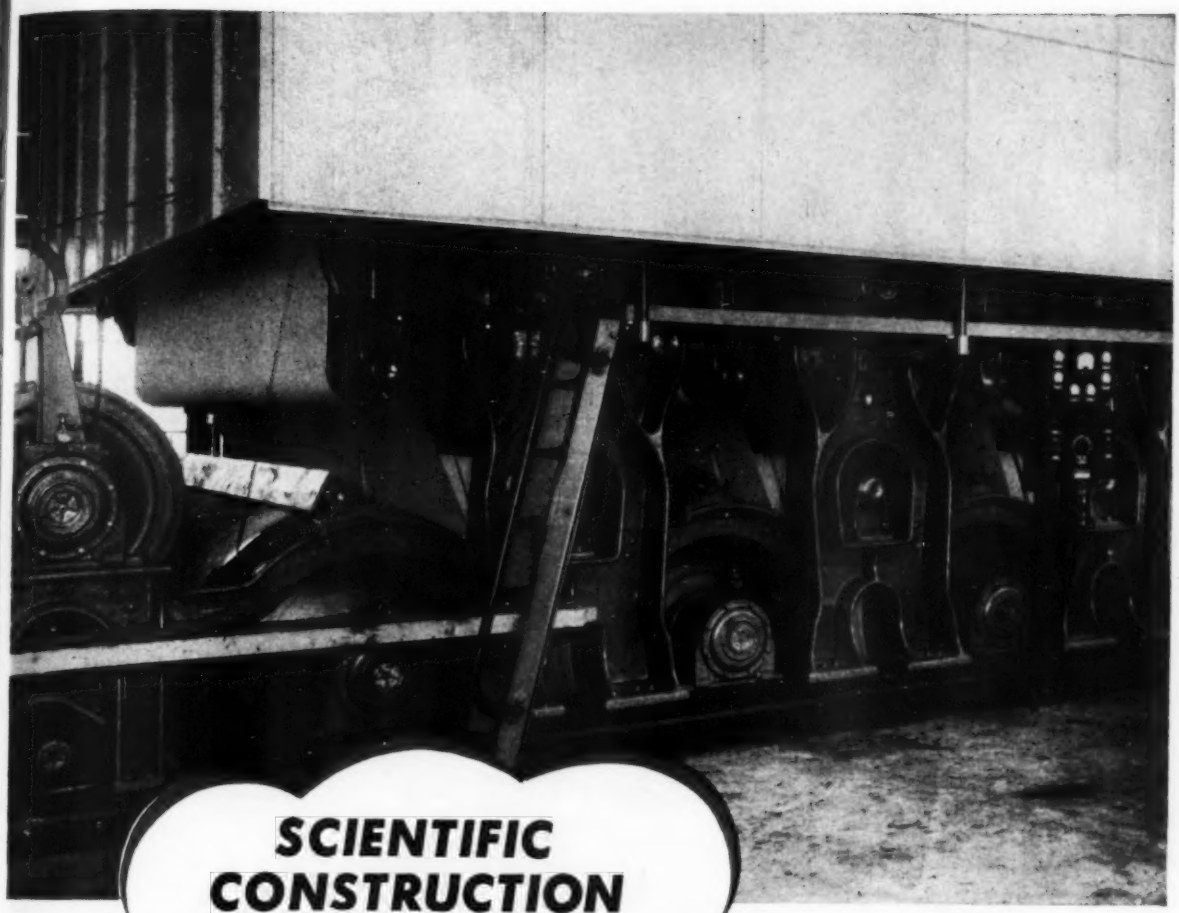
GARLOCK Guardian gaskets are your most effective *and* economical protection against blow-outs and leaks under severe service conditions. They are unaffected by extreme temperatures and pressures.

Permanently tight joints are assured because this gasket compresses and rebounds instantly and repeatedly to conform with expansion and contraction caused by vibration or changes in temperature. Thus, the need for retightening joints is greatly reduced resulting in less maintenance and longer gasket life.

Guard against costly work stoppages in your plant, *specify* GARLOCK Guardian Gaskets.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS

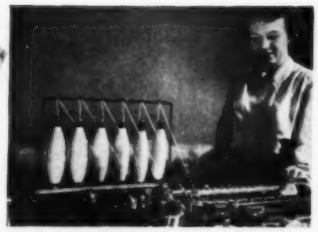


SCIENTIFIC CONSTRUCTION

Makes the Big Difference In DRYER FELTS

Patented WOODBERRY 887 Heavy Duty DRYER FELT

Gives You Scientific Construction*



One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. The unit shown automatically tests 6 strands of yarn at one time.

Mt. Vernon-Woodberry Mills

*Asbestos Yarns Woven Into The Face of Woodberry 887 Heavy Duty Dryer Felt

Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST NEW YORK

"Take the colored boxes up front"

Colored corrugated shipping containers are a bright spot in a desert of nondescript tans and browns. When colored boxes come in, the dealer knows whom they're from—what they contain, and where he wants to put them.

A distinctive *color* becomes associated with a manufacturer or wholesaler. It enhances his prestige with the dealer. And it creates a "family resemblance" among all his products. The retailer can use the colored boxes as a display base.

Show your customers how to profit by a switch to *colored* corrugated containers. Our Technical Staff will help you with dyes specially selected for the job. Write: E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.

FOR MAXIMUM ECONOMY
Du Pont basic dyes

FOR MAXIMUM SOLUBILITY
Du Pont acid dyes

FOR ECONOMY AND LIGHT FASTNESS
Du Pont direct dyes

FOR MAXIMUM LIGHT FASTNESS
Du Pont dispersed organic pigments:
Monastral* Fast Blue BWD or BFP Paste
Monastral* Fast Green GWD or GFP Paste
Lithosol* Pigments

*REG. U. S. PAT. OFF.

More color makes more business ...for your customers and you

Du Pont Dyestuffs
DU PONT
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SURE BATCHING CONTROL

Battery of 4-inch A.C.F. Lubricated Plug Valves controlling flow of resins and varnish at a large paint plant.

When movement of measured quantities of liquids is to be precisely controlled, A.C.F. CYLINDRICAL Lubricated Plug Valves save time. Valve open, the flow moves faster through a valve passage having at least as much area as the pipe itself. Then... a fast quarter-turn—seconds if need be—and the valve is tight-closed! Why any other valve for precise fast control!

A.C.F. CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

Representatives in 50 Principal Cities

Ask for Catalog 4-PI, American Car and Foundry Company, Valve Division, 1501 East Ferry Ave., Detroit 11, Michigan

Sulphur

Thousands of tons mined daily, but where does it all go?

LOOK AROUND YOU and let your glance fall on any object. The chances are 1000 to 1 that sulphur played an important role in its manufacture, either as a component part of the finished product or as a processing element.

Take, for example, the very magazine you are reading. If it's average size it weighs about 1 pound. Made largely of sulphite pulp it required about 0.1 pounds of sulphur in its manufacture.

Multiply this 0.1 pounds of sulphur by the thousands of magazines turned out every day and you'll get some idea of the tremendous tonnage of sulphur required for this *single* division of industry . . . the sulphite pulp manufacture.

Sulphur has long been called One of the Four Pillars of Industry. Today's need emphasizes this fact more than ever. Sulphur producers are making every effort to get maximum production from existing mines and to develop new sources of sulphur as quickly as possible.

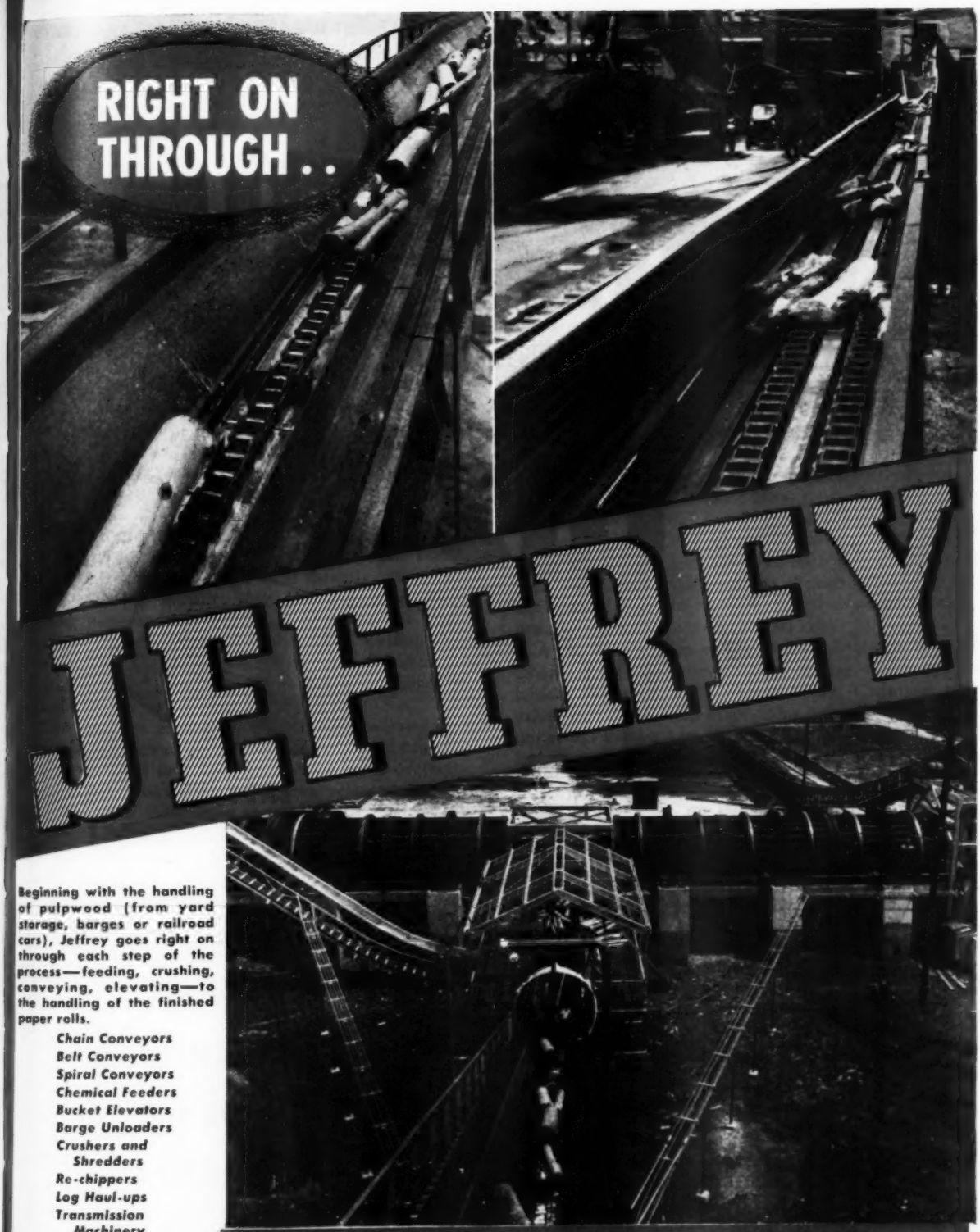
Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas

Texas

1952



Beginning with the handling of pulpwood (from yard storage, barges or railroad cars), Jeffrey goes right on through each step of the process—feeding, crushing, conveying, elevating—to the handling of the finished paper rolls.

Chain Conveyors
Belt Conveyors
Spiral Conveyors
Chemical Feeders
Bucket Elevators
Barge Unloaders
Crushers and Shredders
Re-chippers
Log Haul-ups
Transmission Machinery

Each unit correctly designed and built to help you modernize by mechanizing . . . to bring your mill up to desired efficiency. Take advantage of our years of experience in serving pulp and paper mills.

THE JEFFREY MANUFACTURING COMPANY
944 North Fourth St., Columbus 16, Ohio ESTABLISHED 1877

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio

Vanzyme discs

EASY TO
STACK AND HANDLE

STARCH CONVERTER

for

TUB AND CALENDER SIZING
COATING AND
LAMINATING ADHESIVES

Increase
ACCURACY
ECONOMY
EFFICIENCY
AND SPEED

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York 17, N. Y.

The Paper Industry

February 1952

Another shortage: men

In this time of critical shortages in material things, in raw materials and equipment, industry is faced with what could easily develop into a far more serious problem. Trained manpower is scarce and promises to become an area of serious threat to continued production.

In a recent address, A. E. Harold Fair, president and general manager of Alliance Paper Mills, Toronto, pointed up the problem as it directly affects the pulp and paper industry. Mr. Fair called for more trained papermakers "if we are to produce more paper." Suggesting the establishment of training programs on the mill levels, he warned that the shortage of trained personnel may soon seriously injure the industry's vital production.

The scarcity in college-trained engineers—indispensable to research and operation—is becoming greater and will soon have its serious effect on paper manufacture. According to figures released by the U. S. Office of Education and the American Society for Engineering Education, only 28,000 engineering students will graduate in 1952 to meet a current demand of from 60,000 to 90,000. Compared to the 38,000 engineers graduated during 1951, the estimate of the current crop represents a decline of 25 per cent.

About the only light of hope on the manpower horizon lies in the fact that this year's number of freshmen engineering students is 16.2 per cent greater than in 1950. Industry will not, however, have a chance to benefit from this increase until four years hence, when it may meet stiff competition from the armed forces. And these next four years may well hold in the balance the production victory in the "cold war."

Scrap for production

Defense, expansion and better living depend altogether on production, increasing production to meet increasing need. And all industry must cooperate in the never-ending effort to satisfy that need. By cooperation, the battle of industrial output can result in victory.

Currently, production depends on the availability of the raw materials of industry. Through scrap salvage the nation can meet much of her material requirements. In 1950 industry used 29,500,000 tons of purchased iron and steel scrap alone. By the end of 1951 we were consuming at the rate of nearly 36,000,000 tons per year. The 1952 need has been estimated at between 38,000,000 and 40,000,000 tons.

In other metals the need is just as great. Production of refined copper from scrap is half what it should be due to the scrap shortage. It has been estimated that the supply is almost 50,000 tons a quarter short of needs. Normally, scrap provides a third of our aluminum supply. Today we have only half enough scrap to maintain that ratio. In each quarter we must find 100,000,000 more pounds if production is to be maintained. And the shortage is just as acute in other areas—in brass, bronze, lead and zinc.

A recent program outlined by the United States Chamber of Commerce demonstrates one way in which industry can cooperate. The Chamber has asked that emergency inspections be made so that all unneeded metals and obsolete equipment can be collected and sold to scrap dealers. Company cleanup committees should be organized with the authority to scrap old and unused equipment. Salvage must be a top management responsibility—an organized and permanent "housekeeping" job—for the need will increase, not lessen.

Not only does the cause of defense benefit from scrap salvage. So does the cause of better living. And so does industry. Industry benefits through increased material supply, tax reduction through inventory write off, improved safety conditions, lowered insurance rates, the clearing of valuable space, and financial return for scrap "contributions."

Millions of dimes

Taking a vital part in a vital campaign is a proud privilege. The paper industry is playing an important part in the current March of Dimes to fight polio. Along with other industrial and business organizations, it is cooperating in the national drive to rid the nation of the scourge of infantile paralysis. In New York City, the Paper Division in the campaign has already been organized under the chairmanship of Samuel Kipnis, president of National Container Corp. Represented on Mr. Kipnis' committee are many of the largest pulp and paper firms having plants and branches throughout the nation.

As will millions of people in all parts of the United States, the paper industry will do its share in the campaign.

BECKMAN—*the leading name in pH—presents another important advancement in instrumentation*

Announcing The BECKMAN MODEL N pH METER

Completely Portable!

Extremely Compact!

...and Really Rugged!

In the constantly expanding field of pH, there is wide demand for a *completely portable* battery-operated pH instrument that is low in price, light in weight, compact in size, and amply rugged to be used anywhere—in the orchard, in the oilfields, in textile mills, plating shops, mining and mill operations, food processing plants, laboratories . . . *anywhere*, without dependence upon outside power circuits.

The newly developed Beckman Model N pH Meter not only meets all these requirements, but also many more. Here are the highlights. Check them over. *Never before have unique advantages like these been combined into a single pH instrument!*

OPERATING SIMPLICITY AND ACCURACY . . .

- Accuracy to better than 0.05 pH.
- Low operating cost—less than 2c per hour.
- Built-in temperature compensation—0° to 100° C.
- Fast warm-up—less than 10 seconds.
- "Check Pointer" eliminates need for frequent buffer standardization.
- Batteries are easily checked with the regular panel controls—no need to disassemble the instrument. Clip-mounting of batteries eliminates need for soldering or wiring.

NEW COMPACTNESS AND RUGGEDNESS . . .

- All-metal case—cast aluminum with baked enamel finish to resist wear and corrosion.
- Splash-proof design—fully desiccated internally.
- Shock-proof—each tube is individually shock-mounted.
- Light weight—less than 8 lbs., complete.
- Small, compact—only 4" x 6" x 9½" overall.
- Equipped with the new Beckman Red Label Glass Electrode—virtually unbreakable, covers almost the entire pH range, usable from freezing to boiling.
- By far the most rugged overall construction of any pH meter.

GET ALL THE FACTS on this newest Beckman advancement in pH by contacting your nearest authorized Beckman instrument dealer. Or write direct!

BECKMAN INSTRUMENTS

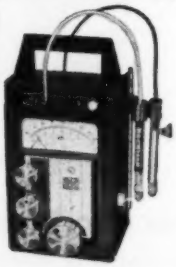
SOUTH PASADENA 73, CALIFORNIA

Factory Service Branches: Chicago — New York — Los Angeles

Beckman Instruments include: pH Meters and Electrodes — Spectrophotometers — Automatic Titrators — Radioactivity Meters — and Special Instruments

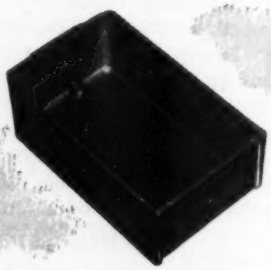
NEW CONVENIENCE SIMPLICITY RUGGEDNESS

make the Beckman Model N a noteworthy advancement. The following features are typical . . .



ELECTRODE SUPPORT ROTATES alongside case for maximum convenience in carrying. Instrument can be used in either horizontal position (shown at left) or vertical position (above)—whichever is handier.

CONVENIENT CONTROLS not only centralize all operating functions, but also permit checking amplifier circuits and battery condition without opening case or disturbing battery connections.



RUGGED, COMPACT DESIGN withstands rough field and plant service with negligible maintenance. Solid cast-aluminum case is strong, yet light in weight. Beckman Glass Electrode is virtually unbreakable!

There are many other important features designed into the Model N. Be sure to get the *complete* story on this new Beckman development!

The Paper Industry Current Comment

Government spending for 1952

President Truman's proposed budget of 85 billion dollars for the fiscal year is giving businessmen cause to consider the effect of such an enormous government spending plan on national business incentive and the prosperity of industry. This, coupled with the increased taxes already in effect, is having its effect on earnings and consequent dividends for shareholders, without considering the possible additional burden of the increased taxes that would be necessitated to meet this proposed budget.

Leaders in Congress are already displaying an unwillingness to grant the appropriations asked for and, to an even greater extent, are showing opposition to an increase in taxes in a presidential election year.

The reaction of business to the Washington proposals is most graphically shown by the annual report of David L. Luke Jr., president of West Virginia Pulp & Paper Co. Rising costs and substantial increases in tax liabilities have, according to Mr. Luke, already forced his company to raise funds from outside sources to help finance expansion programs, which originally were to have been met out of retained earnings. He even hinted that further expansion may be curtailed, in these words:

"Inflation exaggerates the size of the investment required. Taxes diminish the prospective return. Like a pair of scissors, they can operate to cut the justification for any project to shreds."

Graphically, the company's annual report demonstrated the truth of his words when it showed income of $10,326,000 for the fiscal year ending October 31, or $10.80 per share, compared with $12,262,000, or $12.93 per share for the previous fiscal year, despite large increases in the dollar value of sales. Dollar sales of paper and board rose 22 per cent over the previous year to $109,400,000, and the value of chemical products rose 18 per cent to $7,000,000.

This statement from one of the more important eastern paper companies paralleled in effect an earlier statement to stockholders of Kimberly-Clark Corp. by President Cola G. Parker, which attracted wide attention in the Middle Western area. Other companies have called the attention of their stockholders to the danger that Congress is threatening to throttle business, large and small, by loose appropriations.

Business activity down

Coupled with these warnings of inflation in American business are reports, from the industry of less active business. November paperboard output was markedly below earlier months of the year, and the short supply of other papers is being met by production. Kraft producers are beginning to feel the effect of reduced demand, and kraft can be bought now for immediate delivery, when it was not long ago that the mills had order backlogs of several weeks. In some cases distributors have begun to cut back on their orders to the mills. Large retailers are cutting down on their purchases of wrapping materials. One New York dealer summarized the situation when he said that what had been considered an inventory for two months distribution could now be considered as a four-month inventory, owing to the decline in sales.

Mobile and the RFC

The southern businessmen who were involved in the dealings with the RFC that resulted in the former owners of Mobile Paper Mills losing control of their company are still in the news. The latest development is the announcement that the Federal Deposit Insurance Corporation has paid more than $840,000 to protect depositors of a Thomasville, Ala., bank where a large shortage of accounts was uncovered in the wake of a RFC investigation. Loans by the RFC to an Alabama lumber company and the later arrest of a lumber company official and bank officers were part of the complicated problem that the Justice Department is still investigating. The part played by Congressman Boykin in the lumber company's affairs, as well as in the dealings that resulted in the loss of control of the Mobile company mill, are another feature of the involved series of financial transactions that were disclosed by the probe of RFC affairs by a Congressional committee.

Incidental to the series of financial scandals in various governmental agencies it is interesting to note that the President's budget asks funds for the employment of 7,000 additional agents for the Income Tax Bureau of the Treasury Department, many of whose high ranking officials have been forced to resign and in some cases indicted for improper activities.

Warning on wage violations

A definite effort to penalize violators of wage and salary controls may result from spot checks indicating that many companies are paying employees more than federal stabilization rules allow. Employers who have violated the rules may find that their entire payrolls, including base pay as well as illegal payments, may be disallowed for income tax deduction. There are hints that some paper mills are included in the list of possible violators, though no names have so far been disclosed.

Changes at Great Northern

A series of what may be significant personnel changes may be a clue to future plans of Great Northern Paper Co. It has been reported, but not confirmed, that Great Northern is contemplating the utilization of the hardwoods in its great Maine forest holdings for the production of kraft. All that is officially announced is that the company is always looking toward the future. However, William O. McKay, president of Great

10
NASH VACUUM PUMPS
are simple
One moving part. No valves, no pistons, no sliding vanes, no internal lubrication. This makes possible important operating advantages no other type pump offers.
Plus-
NASH
PAPER MILL
KNOW-HOW
NASH ENGINEERING COMPANY
418 WILSON AVE., SO. NORWALK, CONN.

Northern, is becoming chairman of the executive committee of the board of directors, and is being succeeded as president by M. C. McDonald, formerly president of Chesapeake Corp. of Virginia and an outstanding figure in the field of kraft paper and board production. Mr. McDonald has been president of Chesapeake since 1945. Elis Olsson, chairman of the board of Chesapeake, has been elected president to succeed Mr. McDonald.

Financial reports

With the first weeks of the new year the securities markets have reached new averages, in some fields the highest on record, but with considerable selectivity. Some paper mill securities are higher than during December, while others are somewhat lower. The average, however, is practically unchanged from the latter part of December.

Net incomes

Celotex Corp.—Net income for the fiscal year ended October 31 was $3,497,371, as against $3,003,552 for the previous year.

Container Corp. of America—Net profit for the first three quarters of 1951 was $11,247,000, as compared with $7,328,000 for the same period in 1950.

Hudson Pulp & Paper Co.—Net income for twelve months ended August 31 was $3,236,612, as compared with $1,817,250 for the previous fiscal year.

Marathon Corp.—Net income for twelve months ended October 31 was $8,801,001, as compared with $6,536,036 for the previous fiscal year.

Scott Paper Co.—Net income for nine months ended September 30 was $4,482,088, as against $4,571,000 a year ago.

Sutherland Paper Co.—Net income for nine months ended September 30 was $2,064,626, as compared with $2,040,339 for the same period last year.

Union Bag & Paper Co.—Net income for nine months ended September 30 was $9,420,058, as compared with $7,390,698 in 1950.

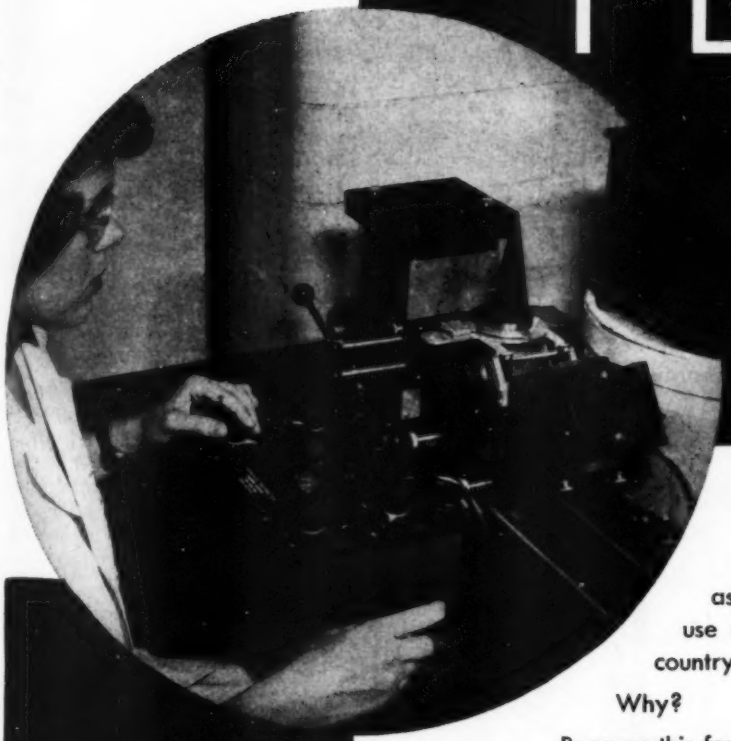
United Board & Carton Corp.—Net income for twenty weeks ended November 20 was $499,080, as compared with $307,404 for the comparable period last year.

United Wallpaper Inc.—A deficit of $212,418 was recorded for the nine months ended September 30, as against a deficit of $276,686 for the same period in 1950.

Western Tablet and Stationery Corp.—Net profit for the fiscal year ended October 31 was $622,559, as compared with $612,822 in the previous fiscal year.

West Virginia Pulp & Paper Co.—Net income for the year ended October 31 was $10,326,000, as compared with $12,-

PEXOL*



SIZE-AID*

Hercules' Pexol, formerly known as Dresinate® 209, is gaining wide use among paper mills all over the country.

Why?

Because this fortified rosin size is cheaper to use than conventional sizes—mill operators report that Pexol is highly efficient, particularly for difficult sizing problems.

Pexol is readily available in paste or dry form. Try it and prove to yourself how this fortified rosin size can help you solve difficult sizing problems and save money, too.

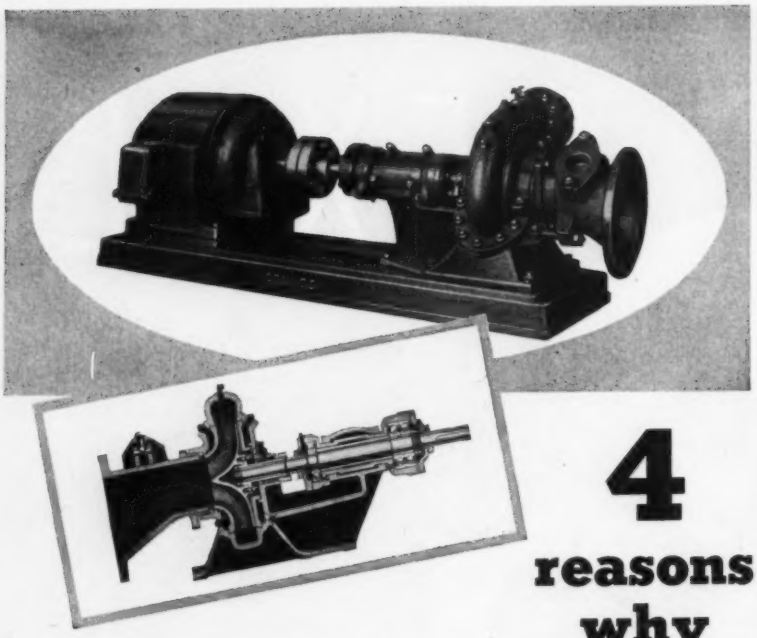
Hercules' research is constantly at work to produce new and better products for the paper industry such as Pexol and Size-Aid. Illustrated above is the Hercules Photometer, a precision tool developed by Hercules to measure accurately transudation rates of liquids through paper.

For further information and technical data about Hercules' research in the papermaking industry, or for samples of Pexol or Size-Aid, write to:

HERCULES POWDER COMPANY
INCORPORATED
Paper Makers Chemical Dept., 961 King Street, Wilmington, Dela.

*TRADE-MARK

PP51-9



4 reasons why

GOULDS STOCK PUMPS REDUCE STOCK HANDLING HEADACHES

1. ***Positive even flow.*** **The inlet tips of impeller vanes are warped to give a screw conveyor effect which insures an even flow and prevents water separation of the paper stock.**

2. ***No jamming.*** **Ejector vanes follow curvature of main vanes of impeller, preventing entrance and jamming of stock or other solid material between back impeller wall and stationary wearing plate.**

3. ***Easy to adjust for wear.*** **Shaft and impeller can be moved axially toward suction side plate to take up wear due to abrasives in material handled.**

4. ***Easy to inspect and maintain.*** **You can inspect or renew rotating element without disturbing bearing assembly. Ample washout connections at top and bottom of casing. Stuffing box readily accessible and stuffing box gland easily removable.**

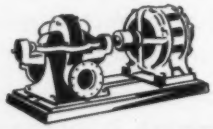
Goulds centrifugal stock pumps are especially designed for efficient handling of paper stock of all kinds and consistencies in mills of all types.

The heavy duty unit (Fig. 3105) illustrated above will deliver up to 4000 G.P.M. Heads up to 220 ft. Available in 4″, 6″, and 8″ sizes. For detailed information, complete specifications, write for Bulletin 723.1.

Other GOULDS PUMPS for Pulp and Paper Mills

This rugged vertical centrifugal stock pump (3115) requires minimum floor space. Available in capacities 150 to 2000 G.P.M. Heads up to 180 ft.

Stainless steel pump for handling acid and alkaline liquors. Capacities up to 600 G.P.M. Heads up to 160 ft. (3705).



For capacities up to 15,000 G.P.M. Heads up to 500 ft. Check the specifications of this Goulds ball bearing double suction centrifugal (3450).

MEMBER

Goulds PUMPS INC.
Seneca Falls
New York

262,000 during the preceding fiscal year, even though dollar volume rose 22 per cent during the year on paper and board sales, and 18 per cent from the sale of chemical products.

Weyerhaeuser Timber Co.—Profit for the first nine months was $30,383,100.

Dividend declarations

Atlanta Paper Co. has declared a 10 per cent dividend, including the regular and an extra dividend, on its common stock, payable to shareholders on record as of December 15. A regular dividend of 10 cents per share was declared on its common stock, payable March 10 for stockholders on record as of March 1.

Bathurst Power and Paper Co., Ltd., has declared an extra dividend of 50 cents and usual quarterly dividend of 75 cents on Class A stock, in addition to $1.25 on Class B stock, payable March 1 to stockholders of record February 1.

Carpenter Paper Co. voted a dividend of 75 cents on the common, payable March 3 to stock of record February 16.

Chesapeake Corp. of Virginia declared a dividend of 50 cents per share on its outstanding capital stock, payable February 15 to shareholders of record February 5.

Consolidated Paper Corp. Ltd. has declared an extra dividend of 75 cents per share plus the regular semi-annual 75-cent dividend, both payable January 17 to stockholders of record December 5.

Container Corp. of America authorized an extra dividend of 75 cents on the common stock.

Cornell Paperboard Products Co. has voted an extra of 10 cents and the quarterly dividend of 25 cents, both payable December 10.

Fibreboard Products, Inc., has declared a regular quarterly dividend of $1.50 a share on the prior preferred stock, payable February 1 to stockholders of record as of January 16.

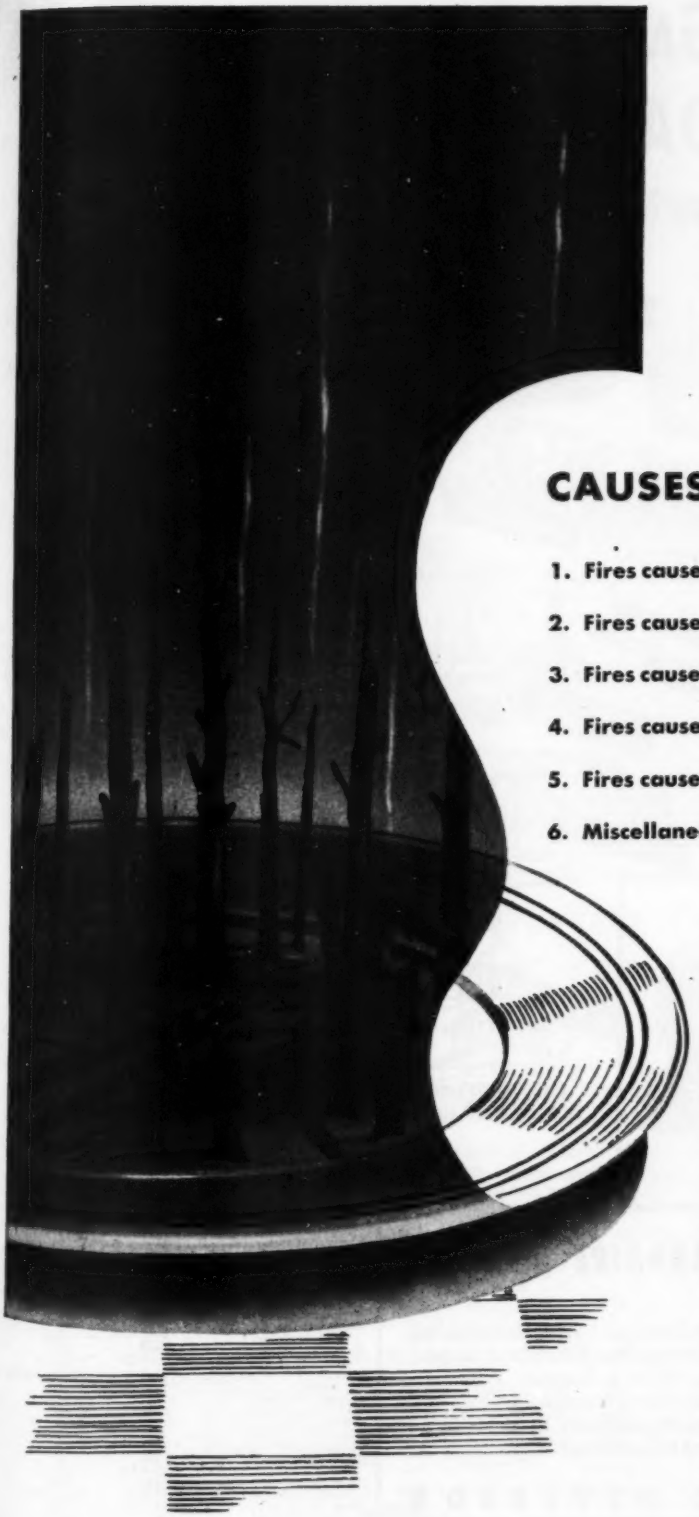
Marathon Corp. has declared a dividend on the common at the new rate of 30 cents, payable February 29 to holders of record February 1.

Mead Corp. has declared a dividend of 40 cents a share on common stock and the regular quarterly distribution of $1.06¼ on the 4¼ per cent cumulative preferred shares, both payable March 1 to holders of record February 8.

Minnesota and Ontario Paper Co. has declared a quarterly cash dividend upon its common stock of 50 cents per share to shareholders of record December 28, payable January 25.

Oxford Paper Co. declared a dividend of 25 cents on the common, payable January 15 to stock of record January 2.

Puget Sound Pulp and Timber Co. has declared a regular quarterly divi-



food for thought...

CAUSES OF FOREST FIRES

1. Fires caused by careless smokers...	19.8%
2. Fires caused by careless debris	18.7%
3. Fires caused by careless campers...	4.7%
4. Fires caused by incendiaries	30.3%
5. Fires caused by lightning.....	9.3%
6. Miscellaneous causes.....	17.2%

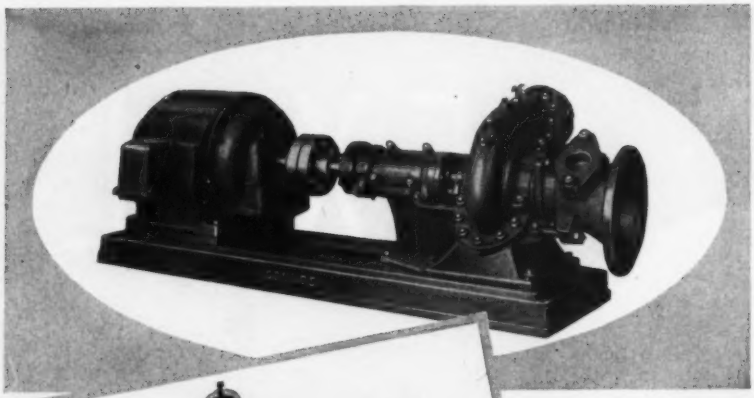
Protection of forests from fire is by far the biggest job in the vast new Tree Farming program taking root across the nation.

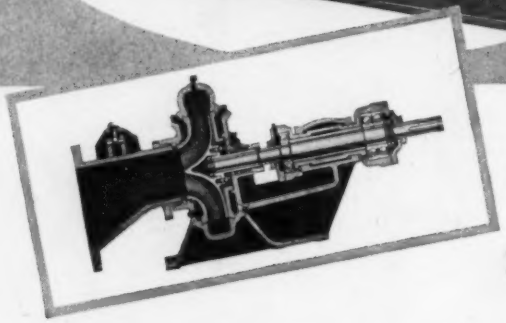
Hundreds of acres of trees can be destroyed in an hour by uncontrolled fire; and in the Pacific Northwest, for example, it takes about 80 years to grow a new crop of trees. Also, fire usually destroys all the trees in its path leaving no seed trees to replant the burned over area. This means months of work in planting thousands of seedlings by hand.

Weyerhaeuser loggers help out in fire prevention by controlled burning of slash in newly logged areas, as required by state law. Lookout stations and fire roads aid our fire-fighting crews and equipment. Cooperative fire-fighting and prevention methods have been worked out with other private companies and government agencies.

You, the public, can help the 2,980 Tree Farmers throughout the country by being more careful with fire in or near forest areas—and by reporting fires promptly. *Everybody* loses when a forest burns... locally and nationally, suppliers *and* users of lumber, woodpulp and other forest products.

WEYERHAEUSER





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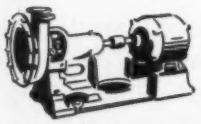

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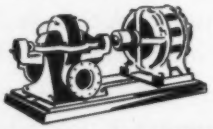

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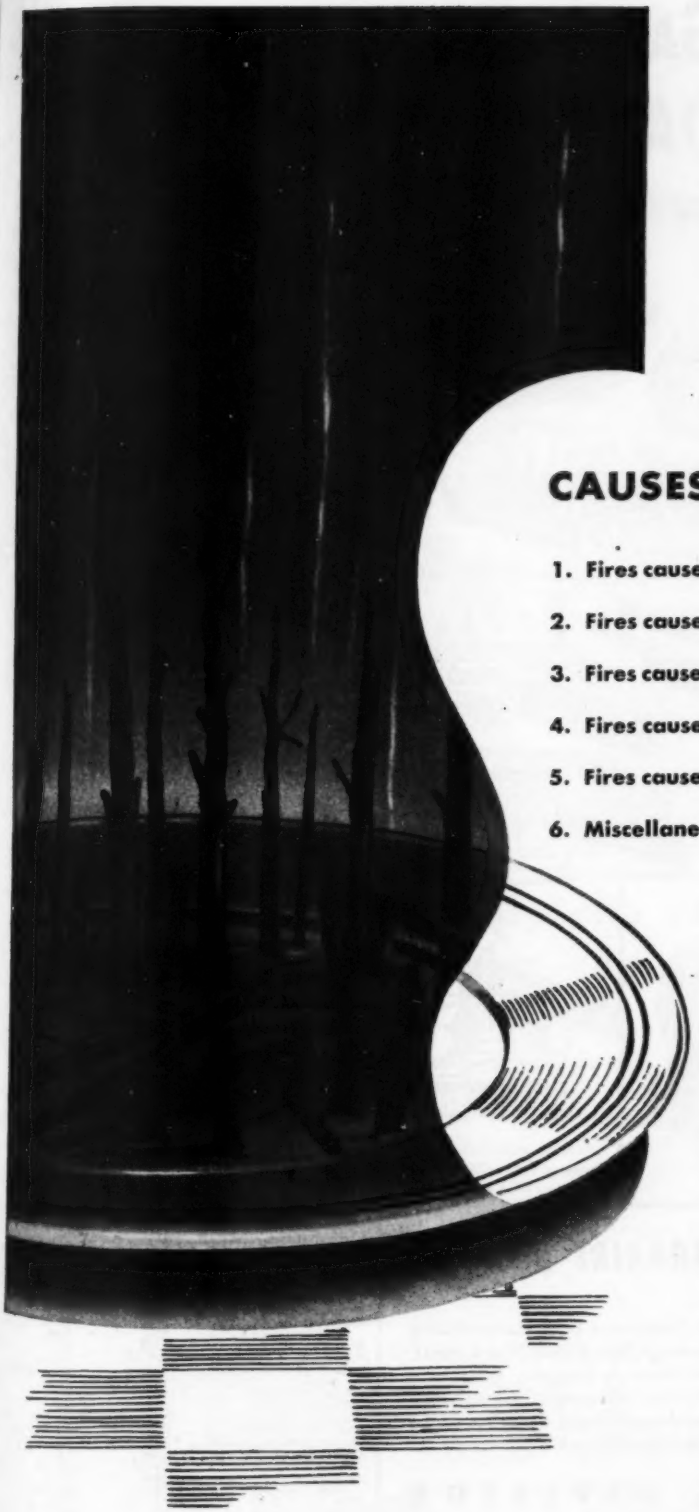

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WEYERHAEUSER

Wherever AIR or GAS is used Investigate STANDARDAIRE

AXIAL FLOW BLOWERS

READ STANDARD'S engineered-for-production program has resulted in the acceptance of Standardaire Blowers for virtually every important industry. Blowers are currently being produced for a wide range of applications in a rapidly expanding market — and in many instances to suit specific requirements and specifications. The amazing acceptance of Standardaire Blowers is indicative of their superior operating characteristics, high efficiency and dependable performance in round-the-clock service. For further details we invite you to consult with our engineers. They will be glad to study your air or gas problems and make recommendations. **Write Dept. F68**

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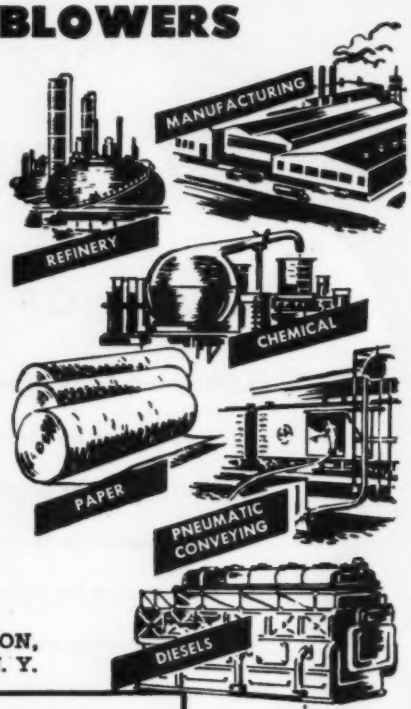
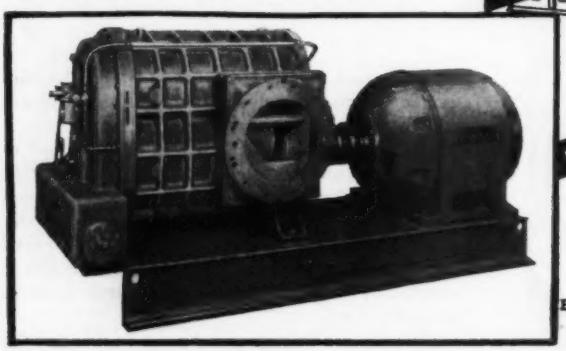
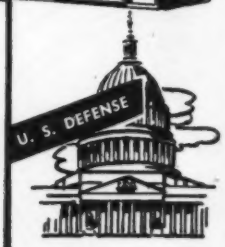
370 Lexington Ave., New York 17, N. Y.







Standardaire 1218B23 Blower to deliver 2850 c.f.m. at 1160 r.p.m.

Engineers like the STANDARDAIRE principle

RECENT BLOWER USERS: Amalgamated Sugar Company • Brillo Manufacturing Co., Inc. • Chicago Pump Co. • Cleaver-Brooks Company • Dow Chemical of Canada, Ltd. • E. I. DuPont de Nemours & Co. • Fairbanks, Morse & Company • Hercules Powder Co., Inc. • Hills Bros. Coffee, Inc. • Husky Oil Co. • Koppers Company, Inc. Monsanto Chemical • National Advisory Committee for Aeronautics • Ozark-Mahoning Co. • United States Navy • Standard Brands, Inc. • West Jersey Paper Manufacturing Co.

BLOWER-STOKER DIVISION

FORMERLY The Standard Stoker Co., Inc.
ONLY THE NAME IS CHANGED

READ STANDARD
CORPORATION

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dend of 50 cents a share on common stock, payable December 29 to stockholders of record December 20.

Sorg Paper Co. has declared a dividend of 25 cents a share on common stock, payable December 21 to holders of record December 13, and a regular quarterly dividend of $1.37 a share on the 5½ per cent cumulative preferred stock for payment January 1 to holders of record December 15.

Western Tablet and Stationery Corp. has declared a dividend of 62½ cents on the common, payable January 15 to stock of record December 27.

Paper mill corporate changes

Everett Pulp & Paper Co. shares in the amount of one-third of the total have been replaced by Simpson Logging Co. notes for $4,000,000 to continue the annual income of $125,000 pledged by the estates of A. H. B. Jordan to the Seattle Children's Orthopedic Hospital.

Olin Industries, Inc., stockholders have approved terms of a merger with Frost Lumber Industries, Inc., and agreed to split the firm's stock on a three-for-one basis. Olin is reported to be planning construction of a wood pulp mill to utilize timber from the vast Frost holdings.

Sorg Paper Co. announced January 19 that stockholders had voted to increase the authorized common stock from 176,908 to 300,000 shares.

New York Stock Exchange—Stocks
(Closing Prices)

	Jan. 21, 1952	Dec. 20, 1951
A.P.W. Products	6⅞	• 6¼–6½
Celotex	17⅞	18¼
Same Preferred	• 16½–17⅛	16½
Certain-teed Products	14⅜	15⅛
Champion P. & F. Co.	28⅜	27⅞
Same Preferred	• 98–99½	• 98–99
Chesapeake Corp.	33	• 34–36
Continental Diamond	14⅛	14⅜
Container Corp.	35½	36½
Same Preferred	• 99–100	• 96½–98½
Crown Zellerbach	55¼	54
Same Preferred	99⅝	99⅜
Dixie Cup	• 34½–35½	37½
Eastern Corp.	24⅜	26⅞
Robert Gair	18⅞	18¼
Same Preferred	• 19⅜–19⅝	• 19¼–19¼
Gaylord Container	27½	29
International Paper	46⅝	49⅝
Same Preferred	*101–103	98¼
Kimberly-Clark	47	46⅝
McAndrews & Forbes	• 42½–44	• 42½–43½
Marathon	59	56
Masonite	31⅝	35
Mead Corp.	25½	25¾
Same Preferred	• 92½–96	• 93¼–94
National Container	12⅝	12⅝
Rayonier, Inc.	32⅝	33⅜
Same Preferred	35½	34⅜
Scott Paper	53½	51½
Same $3.40 Preferred	• 90½–91	• 88–90
Same $4.00 Preferred	*103–104	*101½–103½
St. Regis	18½	17⅝
Same Preferred	90	91¼
Sutherland Paper	23⅝	24
Same Preferred	*106¼–107½	*105–105
Union Bag & Paper	48⅞	48⅝
United Board & Carton	• 16½–16⅝	• 17–17¼
United Wall Paper	4½	3
Same Preferred	• 27–27¼	• 25–26
U. S. Gypsum	110½	106½
Same Preferred	*170–175	*165–168
West Va. P. & P. Co.	• 76–78½	82½
Same Preferred	107	*106–107

New York Stock Exchange—Bonds

Celotex 3½%	99	101
Champion P. & F. Co. 3%	101	102
Mead Corp 3%	98	97½

New York Curb Exchange—Stocks

Am. Writing	———	11⅜
Great Northern	56	54
Hammermill	42	36

*Closing Bid and Asked Prices.

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ONLY THREE TO FIVE PER CENT of Du Pont "Alathon" polythene resin in wax gives a glossy, lacquer-like finish to paper that's ideal for food wraps. Blocking temperature is raised by 15° or 20° F., too, making hot-wrapping possible.

A BLEND OF "ALATHON" AND WAX is harder and tougher than plain wax. It also has increased grease resistance. Yet no changes in methods of application are necessary . . . and so little "Alathon" is needed to improve wax performance that production costs remain nearly the same.

UNMODIFIED COATINGS OF "ALATHON" have many advantages, too. They are economical. For instance, one pound of "Alathon" resin will cover 30,000 square inches of paper with a 1-mil-thick coat.

"Alathon" resists water vapor, keeps moisture where *you* want it . . . inside or out. It stays flexible, even down to minus 70° F. . . . doesn't crack or flake off. "Alathon" is excellent for coating frozen-food packages, ice cream containers and the like.

"Alathon" is chemically inert. Coatings resist acid and alkalies . . . impart no taste, odor or toxicity. Paper packages coated with "Alathon" are ideal for dairy, meat and other food products.

"ALATHON" CAN GIVE YOU more sales in the future. Because of its outstanding chemical and physical properties, manufacturers and processors of many kinds of industrial and consumer goods will want paper coated with "Alathon" for their packaging material. Plan *now* to profit with "Alathon." We will gladly assist you on development work. For further information, write:

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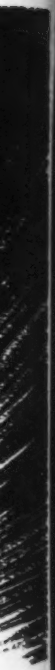

The Paper Industry News of the Industry

Wisconsin Continues to Lead in Sulphite Pollution Research

Wisconsin pulp and paper mills have voted to maintain their extensive sulphite pollution research program, according to an announcement from the Sulphite Pulp Manufacturers' Research League at Appleton. At their annual meeting in Neenah, League directors representing 12 firms with sulphite pulp mills in Wisconsin and Michigan committed their companies to financial contributions for a 1952 research budget substantially larger than the group's 1951 total outlay.

"Wisconsin and Michigan sulphite manufacturers are keeping up their cooperative research and putting more money than ever into it, even though several of our members are going ahead with active programs to build plants that will control sulphite pollution at their mills," J. M. Conway, president of the League and of Hoberg Paper Mills, Green Bay, declared during the meeting. "The industry is sincerely determined to continue its work on this difficult scientific problem until the chemists and engineers can show us ways that will be practical, judged by both technical and economic standards."

New Developments in Fuels

According to the League, an improved fuel is being burned in space heaters, furnaces, and open fireplaces in the Green Bay area. The development is part of the constant effort to find new and economic uses for sulphite wastes. The new fuel blocks are the size of common brick, are practically dustless, produce little smoke or ash, and have approximately 25 per cent greater heating value than ordinary coal. They are made by compressing small coal particles after mixing with sulphite liquor, which serves as a binder.

Executives of F. Hurlbut Co. and the League cooperated to develop the idea. The League has been working on the use of spent sulphite liquor as a binder for other types of coal briquettes. The Hurlbut firm operates a coal dock and also manufactures concrete blocks.

Ordinary fine coal, a byproduct of Hurlbut dock operations, is run through the concrete block-making machinery along with sulphite liquor that has been concentrated to contain 60 per cent wood solids. The binder is itself an excellent fuel, and it enriches the coal fines. The concentrated liquor is being supplied from the League's Appleton pilot evaporator plant, which has the only evaporators in the state capable of handling spent sulphite liquor. The concentrate is produced in the course of experiments with the evaporation process.

Consolidated Submits Pollution Plans

Plans to reduce pollution of the Wisconsin River at Biron and Whiting have been submitted for state approval by Consolidated Water Power & Paper Co., Wisconsin Rapids. The state's order of last April merely required the firm to provide adequate treatment of sanitary sewage at these points. In two communications recently made public, Stanton W. Mead, president of Consolidated, told the State Board of Health and Committee on Water Pollution that his company is submitting plans in advance to make certain these will be acceptable to the state.

The village of Biron already has submitted plans for an Imhoff tank treatment plant. Consolidated proposes to connect with this. At Whiting the company intends to install its own Imhoff tank plant. Both installations have been engineered by Baxter & Woodman of Crystal Lake, Ill.

Last October Consolidated gave state authorities an interim report on its program for reducing sulphite pollution of the Fox River at Interlake Mill, Appleton. Construction of a plant to evaporate and burn spent sulphite liquor has already been started there, and this report pointed out that prospects are good for its early completion. However, the state's outstanding order required completion by December 31, 1951, which was impossible because national defense requirements delayed deliveries of stainless steel for non-defense projects. Basing its plans on the best information obtainable from steel mills and fabricators, the firm has reported that it hopes to complete installation of the big stainless steel evaporator at the Interlake mill about the middle of this year.

River Valley Conservation Bill Provokes Discussion

The so-called River Valley Conservation Authority Bill (Rankin, H. R. 4882) has aroused considerable interest among pulp and paper manufacturers. The bill would create nine authorities, each with considerable power over forestry conservation, stream pollution control, water conservation, and all natural resources.

The authorities called for by the Rankin bill are as follows: Atlantic Seaboard, Great Lakes-Ohio Valley, Tennessee Valley, Missouri Valley, Arkansas Valley, Southwestern, Columbia River,

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California, and Colorado Valley. These watersheds, together with the area included under the jurisdiction of the Mississippi River Commission, would include most or all of the territorial United States.

Vance P. Edwardes to Study Sulphite Waste Processes

Vance P. Edwardes of Corinth, N.Y., former TAPPI president, has been retained by the National Council for Stream Improvement to study and report on the applicability of all known processes relating to the evaporation and incineration of sulphite waste liquor.

Mr. Edwardes has been engaged for the past several months in accumulating all available information, both in the United States and abroad, and when all the data is in hand is to prepare his evaluation. It is expected that his report will be available to all Council members after the first of the year.

Two Paper Mill Men on Maine Commission

Included in the membership of the Maine Water Improvement Commission are two representatives of the paper industry. The men, recently appointed to the posts by Governor Payne, are Clifford G. Chase, St. Croix Paper Co., and Roy V. Weldon, Great Northern Paper Co.

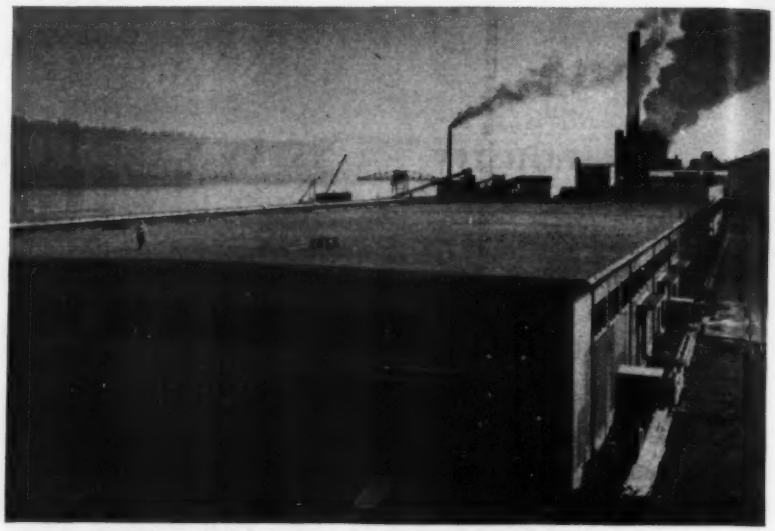
Other members of the Commission are Lyman S. Moore, town manager of Portland; Wendall D. Brown, selectman of Wilton; Fred Beck, Presque Isle attorney; J. Elliott Hale, superintendent of the Kennebec Water District, Waterville, and Dr. Dean Fisher, state health officer.

Ontario Paper May Convert Wastes to Vanillin

Ontario Paper Co. Ltd. at Thorold, Ont., is reported to be planning the conversion of mill waste liquors into vanillin. According to an official of the firm, the chemical process that is to be utilized is entirely new in the industry. Ontario has already started construction of a $1,300,000 vanillin manufacturing plant. The facility is designed to produce 400,000 pounds of the flavoring material yearly. A large portion of the production is slated to be sold to Dow Chemical Co.

Crown Zellerbach Corp.
plans to construct a $500,000 plant to dispose of waste liquor at its mill in Lebanon, Ore. Herbert Wymore, resident manager of the mill, said construction is to begin at once, with completion planned as soon as materials can be obtained. Installation of the process, which has been studied at a pilot plant in Lebanon for two years, will mark the first time an Oregon sulphite pulp mill has disposed of its waste liquors.

Canadian Expansion Continues as . . .



ONE OF THE FIRST PHASES of the Harmac mill expansion to be completed is this 250-foot warehouse expansion; storage facilities are being about doubled

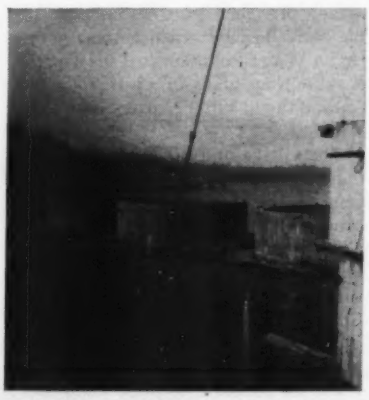
MacMillian & Bloedel Launches Vast Project

Expansion to an eventual 550 tons per day has been started at the Harmac mill of MacMillan & Bloedel Ltd. near Nanaimo on Vancouver Island. With completion expected in the late summer of 1953, the current $20,000,000 project will make the mill the largest kraft unit in western Canada. Present daily capacity is 250 tons. Already completed is a 250-foot warehouse for pulp and general storage. Total investment at the mill is expected to be well over $40,000,000.

Newest innovation to be included in the project is the method by which chips are handled. Operated largely on waste from the sawmills of the huge MacMillan & Bloedel interests, the mill at Harmac has been receiving chips by trailer from various points on the island, principally Youbou. As a part of the present expansion, an entirely new development in pneumatic conveying has been installed. The conveyor is expressly designed for handling chips and works on the principle of forced feeding to the air stream from the blowers.

Eight Digesters Added

Eight new digesters are to be added to the four now in use at the mill, giving not only added capacity but allowing a slower cook with subsequently quality increase. Shutdowns for repairs will be possible without loss of production. This in turn will necessitate expansion in all departments, such as the screen room,



CIRCULAR FORMS that will be lowered to the sea bottom as the first step in the expansion of wharf facilities; cylinders will be filled with concrete

CYLINDRICAL STEEL REINFORCING to be used within the cylinders prior to the pouring of concrete; the solid cylinders will comprise the footings for the wharf

bleaching, high density, recausticizing, recovery boiler, evaporators, precipitators, steam generating, blow tank, and heat exchanging. The new blow tank is to be installed by Dominion Bridge, while Lundberg of Seattle is supplying the Rosenblad heat exchanger system.

It is expected that a double Flakt section will be added to the machine room. The excavation for this addition is practically completed.

Three Silos Completed

Three additional silos have been completed for chip storage, and these are now in use in conjunction with the pneumatic chip-handling equipment.

A dam at the headwater of the Nanaimo River, just below Fourth Nanaimo Lake, will supply process water to the mill expansion through a 50-inch wood stave pipe. The earth and rock fill dam and pipeline are expected to cost approximately $2,000,000. H. A. Simons, consulting engineers for the entire project, are in charge of this phase of construction.

Wharf Facilities Partially Completed

New wharf facilities are partially completed. The original plans called for the installation of a pile wharf set into fill that would be dumped on the ocean floor. Strong tides and currents made this impractical, and plans now embody a cement and steel wharf. Wooden forms will be lowered to the ocean floor onto prepared seats, and the forms will be piled up to form a cylinder. A cylinder of reinforcing steel will then be lowered into the forms and the concrete poured by the Tremie underwater process. The solid reinforced pillar so formed will be the footing for the wharf construction.

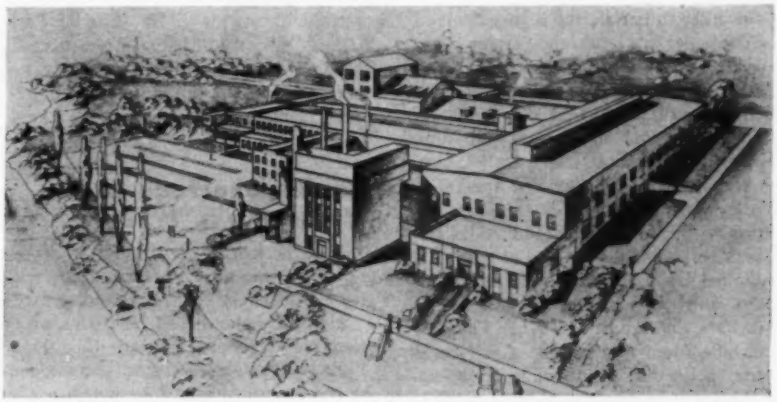
Pulpwood Puts Model Town in Canadian Woods

Heron Bay, Ont., is a model town. Ten years ago this tidy forest community in the Ontario wilderness did not exist. Located on the northern shore of Lake Superior, Heron Bay was created by Ontario Paper Co. for its workers.

The village, with 25 permanent families, has no mill but cuts pulpwood for Ontario Paper's mill at Thorold. Company owned and leased ships load in a harbor 25 feet deep, then steam across Lake Superior, through the Sault Ste. Marie locks and down to Thorold on the Welland Canal.

Heron Bay is a model town of new homes, work shops, a schoolhouse, hospital, and community hall. It has electricity, sewage system, street lighting, curling rink, and tennis courts. The church, made famous in a Canadian radio broadcast as "the church without a name," is used by all denominations. The town is 200 miles from Port Arthur and Fort William and has rail connections both east and west. There is as yet no highway connecting the woods town with the Twin Cities at the Head of the Lakes.

Sixteen hundred square miles of timber limits are leased for the Heron Bay operations, which were started in 1938. Some 850 men are employed in the woods at the peak of the cutting season, of whom about 250 are permanent woods workers. The rest are farmers, road construction workers, and so on.



ARTIST'S CONCEPTION of how Provincial's mill at Thorold, Ont., will appear on completion of the present multi-million dollar expansion program; most of the construction will be finished and most of the equipment installed by early next spring

Provincial Paper to Triple Fine Paper Production

Provincial Paper Ltd.'s Thorold, Ont., mill is being expanded under a multi-million dollar program that embraces the tripling of production of book, writing, and other fine papers. Included in the project is the construction of Canada's largest wastepaper pulping plant. Employment is to be increased by more than 50 per cent.

The first phase involves the modernization and acceleration of the Thorold paper machines, which are of 140-inch and 90-inch widths, and the addition of a third machine of 136-inch width. These will raise the production from 55 tons to about 135 tons. Subsequent addition of a fourth machine, of 120-inch width, will ultimately more than triple the current output.

Site Expanded

Recent extensions have enlarged the site to five acres, while new buildings have more than doubled the floor area of the mill. The structures will house all ancillary equipment large enough to handle the production of the four paper machines, including a new finishing room with tripled facilities for sheeting and otherwise finishing roll paper. A two-story office building has been added.

Wastepaper Pulping Expansion

Believed to be the most modern of its kind anywhere, a new plant utilizing waste as its material will supply a large part of the mill's fibre requirements. Its capacity will exceed 100 air-dry tons per day, which will be supplemented by virgin pulps from Provincial's Port Arthur mill, from the Smooth Rock Falls plant of the parent company, Abitibi Power & Paper Co. Ltd., and from other sources.

The wastepaper plant includes a 2500-ton-capacity storage building. After pulping and deinking, the stock is pumped into the three-stage continuous bleaching system, comprised of the chlorination stage, the caustic stage, and the hypo-chlorite. Thence, it is stored at high consistency, 20 per cent stock to 80 per cent water, in a 40-ton vertical storage chest. From the chest, it is routed to the beater room pulpers to be mixed with virgin chemical pulp into the furnish for various grades of paper.

A completely new laboratory will apply progressive quality control through test stations and other procedures governing every step in the manufacturing process.

New Power Facilities

Additional power for the expanded mill is to be provided by a new Foster-Wheeler boiler capable of delivering 75,000 lb. per hour at 250 lb. pressure. This is in addition to the present boiler installation, which delivers about 17,000 lb. per hour at 150 lb. pressure. The two are to be brought into conformity, so their combined capacity will be 92,250 lb. per hour, with a peak load of 115,800 lb. The new Graver water-conditioning unit will deliver to the boilers distilled water. There is also an electric boiler that is available as a spare.

The new ash-disposal system is pneu-

matic and will serve both boilers. It drops the ashes, sucks them into a hopper and drops them through a dustless unloader. Trucks delivering coal will be utilized to carry away ashes on their return trips. The disposal system is a product of Chicago Fire Brick Co.

Pulpers Increased

In order to handle the higher demand of the paper machines, the Stapley pulpers are being increased from four to 11. This equipment was developed by S. G. Stapley, mill production manager, and is manufactured in Canada by Wm. Kennedy & Son Ltd., Owen Sound, Ont.

The paper machines will be fitted with Valley flow boxes and Dominion fourdriniers. Suction presses and additional driers will be added, as well as new reels supplied by John Inglis Co. Ltd., Toronto, and new winders from Appleton Machine Co., Appleton, Wis. The new machine room will include a rail crane running the full length of the building.

The modern finishing room, housed in a wholly new wing, will handle the increased production of the machines. All roll finishing, including wrapping and weighing, will be done on the ground floor, which adjoins the delivery end of the paper machines.

Also on the ground floor are the supercalenders, which process about 25 per cent of the mill's production. Their numbers have been increased to three, with Kohler wind and unwind reels, and their joint capacity has been raised by 50 per cent. The present rewinder has been supplemented by a 120-inch Appleton winder. These machines are also on the ground floor of the new finishing room wing. Ample space has been provided here for the storage of roll paper waiting to be sheeted or supercalendered.

Celgar Development Co. Announces $65 Million Project

Celgar Development Co., an affiliate of Celanese Corp. of America, has announced plans to embark soon on a $65,000,000 wood pulp and newsprint development in the Arrow Lakes region of southeastern British Columbia. The project calls for the construction of at least two mills near the town of Castlegar, approximately 250 miles east of Vancouver in the West Kootenay area.

The firm has reported that the development will ultimately mean employment for more than 2,000 persons. Details of the project were outlined in statements by Harold Blancke, president of Celgar, and E. T. Kenney, British Columbia minister of forests.

Howard Smith Paper Mills Ltd.

is reported to be considering the purchase of 54 acres of land from the city of Cornwall, Ont., for the purpose of further expansion. The property, opposite the present mill site of the firm, has been priced at a reported $65,000.

Pulpwood Cut

in the Port Arthur-Fort William, Ont., area should be processed in Canada instead of being shipped raw to the United States. This was the opinion expressed recently by Mayor C. W. Cox of Port Arthur, who said that the practice of shipping raw pulpwood was partly responsible for the emigration of Canadians from the Lakehead.

Sulphur Shortage Seen Worsening in 1952

That the worldwide sulphur shortage, which became pronounced in 1951, will grow worse this year was predicted recently by Langbourne M. Williams, president of Freeport Sulphur Co., New York, N.Y. Despite record production by the American brimstone industry, the discovery of a large new deposit in Louisiana, and projects to develop three others, any significant increase in the over-all supply of the mineral is at least a year away.

U.S. production of sulphur in all forms in 1951 was approximately 6,200,000 long tons. Of this amount, it is estimated that 5,325,000 tons was elemental sulphur or brimstone from Gulf Coast salt dome deposits, 200,000 tons was brimstone recovered from refinery and sour natural gases, 400,000 tons was sulphur in pyrites, and the remainder was sulphur obtained in other forms from smelter gases and other sources. Production in 1950 approximated 6,000,000 tons.

While production for 1951 was sufficient to meet domestic needs, it was not enough to meet both domestic and export demand. Government-directed exports to friendly nations took almost 25 per cent of Gulf Coast brimstone production. As a result, major brimstone producers were compelled to resort to allocation programs to domestic consumers.

Exports of crude sulphur in 1951 amounted to approximately 1,300,000 long tons, or almost 95 per cent of the 1950 total. The United Kingdom was the recipient of the largest allocation. Its quota was approximately 400,000 tons, compared with 420,000 tons in 1950.

Urges Allocation on Essential Basis

In considering the output for 1952, Mr. Williams urged that the government, which has assumed complete control over the distribution of sulphur, limit shipments to the amount actually being produced, and that this sulphur be allocated to consuming industries in the best interests of the defense program. He warned that stockpiles must not be further reduced. Stocks of mined brimstone are now at a level that is "a minimum for national security." At year's end, these represented about six months' inventory, compared with a prewar peak of two years' supply.

More than half a hundred projects are being undertaken in 19 free world countries. These projects may add as much as 3,000,000 long tons a year to production by 1954.

Garden Island Bay Largest

Of these projects, the most prominent is the new deposit at Garden Island Bay in Louisiana, which will be the largest sulphur development anywhere in the world in 20 years. A $10,000,000 to $15,000,000 plant with an annual production goal of 500,000 long tons is being built by Freeport near the mouth of the Mississippi River. It is scheduled to be placed in operation near the end of 1953.

The year also marked the start of development by Texas Gulf Sulphur Co. of a new mine at Spindletop dome near Beaumont, Tex., the beginning of operations by Jefferson Lake Sulphur Co. at its Stark dome in Calcasieu Parish, La., and the start of development of another Louisiana deposit, Bay Ste. Elaine, considerably smaller in size than Garden Island Bay, which Freeport will mine with an "amphibious" plant. These mines and expansion of an existing mine will increase brimstone output by more than 1,000,000 long tons yearly if production plans are realized.

NPA Optimistic

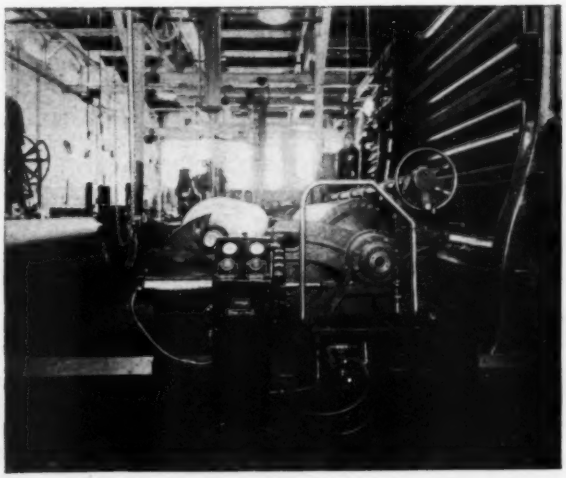
Although individual sulphuric acid producers are to be limited to 90 per cent of their 1950 rate of sulphur use, the over-all industry's total output of sulphuric acid in the first four months of 1952 probably will be slightly greater than last year's rate of production, according to the Sulphuric Acid Industry Advisory Committee. The group met recently to discuss tentative orders that NPA has drafted to place certain restrictions on production and use of sulphuric acid and sulphur.

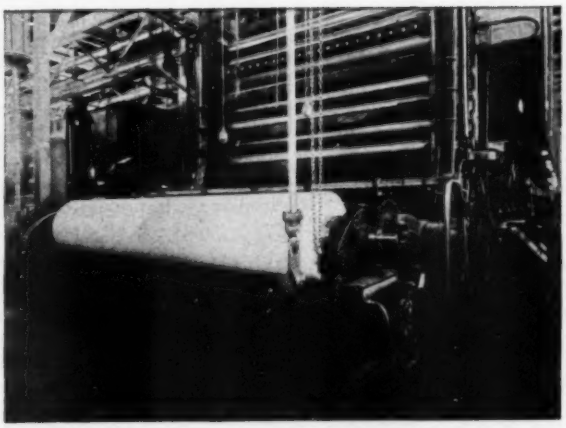
DPA Sets Production Goal

Annual production of sulphur and sulphur equivalents amounting to 8,400,000 long tons by 1955 has been set as a goal by the Defense Production Administration. This is an increase of 2,320,000 tons over the 1950 supply of 6,080,000 tons, and a boost of almost 1,250,000 tons over the 7,150,000 tons that would be available in 1955 on the basis of existing operations and the present government stimulation program.

Establishment of the expansion goal

MODERNIZE FOR PROFIT





with a new Reel

An increasing demand for the Puseyjones Improved Type Uniform Speed Reel reflects the enthusiasm of the industry for this important new development. A prominent mill made the first installation . . . and soon placed orders for two additional Reels. Many other mills are now replacing older-type Pope Reels with this efficient Reel.

The improved Uniform Speed Reel is outstanding for simplicity of operation. A pneumatic adjustable loading mechanism simplifies reel changes and gives added safety to the operation. There is no loss of production time. Operation is at constant paper speed.

Whether you are interested in modernizing your present machine for better profit or installing a complete new high-speed paper-making machine, the experience of Puseyjones engineers is at your service. Write or call us today.

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Wilmington 99, Delaware, U.S.A.

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will allow the DPA Office of Resources Expansion to consider application for certificates of necessity to permit rapid tax amortization, and permit other government agencies, such as the Defense Materials Procurement Agency, to extend, if necessary, other forms of assistance such as loans and purchase contracts.

Consolidated Paper Corp. Ltd.
has started construction of a $500,000 plant at Grand 'Mere, Que., to produce from 4,000 to 5,000 tons of elemental sulphur per year from Quebec pyrite ores. According to an official of the company, the plant is scheduled to be completed in the summer of 1952 and will employ about 100.

Abitibi Power & Paper Co. Ltd.
has opened a mineral exploration department under the direction of C. C. Huston and over the next few years plans a survey of mineral possibilities of its holdings in northern Ontario.

Shell Oil Co.
has started production of elemental sulphur in its Jumping Pond, Alta., Canada, natural gas field. The $500,000 unit will recover 10,000 tons of sulphur annually from the waste acid gases of the gas-scrubbing plant. The process being used achieves 99.9 per cent unity.

Custom Rates Blamed for New York Industry Slowdown

Differences between United States and Canadian customs rates have been blamed for "severe injury to northern New York's paper products industry." R. J. R. Reeder, executive of Climax Fibre Drum Co., Carthage, N.Y., declared recently that for the past two years his company has been losing business to Canadian concerns.

He told Rep. Clarence E. Kilburn in a letter that "this loss has become very serious. For a time we felt that this was possible because of lower labor and material costs. In fact, there is some truth in that assumption. But we were brought up short . . . on learning that the real reason is the difference in customs rates."

Wastepaper Remains in Oversupply

Dealers throughout the country report vast amounts of surplus wastepaper. According to Haskell Stovroff of Buffalo, N.Y., president of the Waste Paper Institute, mill buying and demand for the products of the board mills will have to increase tremendously to correct the oversupply situation in wastepaper and avoid several months of readjustment.

Carroll Slocum, paper stock manager of American Box Board Co., Grand Rapids, Mich., reports that the firm is buying wastepaper "because we feel obligated to the general public for having supported us so generously last year when the shortage of wastepaper was acute." American now has 3,000 tons of surplus wastepaper and is now operating with almost a month's backlog, as opposed to the usual 13-day backlog.

New York packers have indicated that they will continue to burn wastepaper until there is a turn for the better in the market, until other methods of disposal are devised, or until they can cut down on collection against contracts with office buildings, hotels, and industrial plants.

Hudson Executive Reviews Industry Progress in '51

The American pulp and paper industry enjoyed the greatest productive year in its history during 1951, producing an all-time record total of more than 26,500,000 tons of paper, paperboard, and building board. In a statement made early in January, William Mazer, executive vice president of Hudson Pulp & Paper Corp., declared that according to a study made by the American Paper & Pulp Association new plant construction and improvement of existing machines increased total papermaking capacity by about 800,000 tons annually. Expanded facilities for pulp production increased total annual capacity by approximately 17,600,000 tons, a gain of 1,425,000 tons for the year.

William Mazer

Greater concentration on integrated mills, incorporating pulping, papermaking, and converting facilities, is becoming more pronounced in new and projected plants. Hudson's new Palatka, Fla., mill, for instance, will convert 85 per cent of its output into kraft, gummed tape, grocery bags and sacks, and multi-wall sacks for chemicals, fertilizers, and other industrial products. It is estimated that about 85 per cent of new or planned production will be in integrated mills, because they permit greater efficiency, less handling, and less downtime.

1,000,000 Tons for 1952

Additional new mills with an annual capacity of more than 1,000,000 tons are expected to come into production this year, and in 1953 a total of 651,000 tons productive capacity will be added by plants now under construction. According to Mr. Mazer, it seems unlikely that, due to government limitations on construction, any substantial additional capacity will be started in the next two years if the present defense emergency continues, except possibly in the field of newsprint production.

In general, the industry was able to satisfy all demands for paper products during 1951, although it was not always possible to supply certain special types in unlimited quantities. Some products, notably tissues, were available in large quantities and in consequence showed substantial sales gains. Tissue household napkins, roll towels, and bathroom tissues established all-time records. A survey recently undertaken by Hudson revealed that paper napkins are now used regularly in about 75 per cent of American homes.

Eleven Firms Cited for Management Excellence

Eleven companies in the pulp and paper industry have been awarded Certificates of Management Excellence for the year 1951 by the American Institute of Management, New York, N.Y. The Institute is a non-profit foundation devoted to the study and improvement of corporate organization and management.

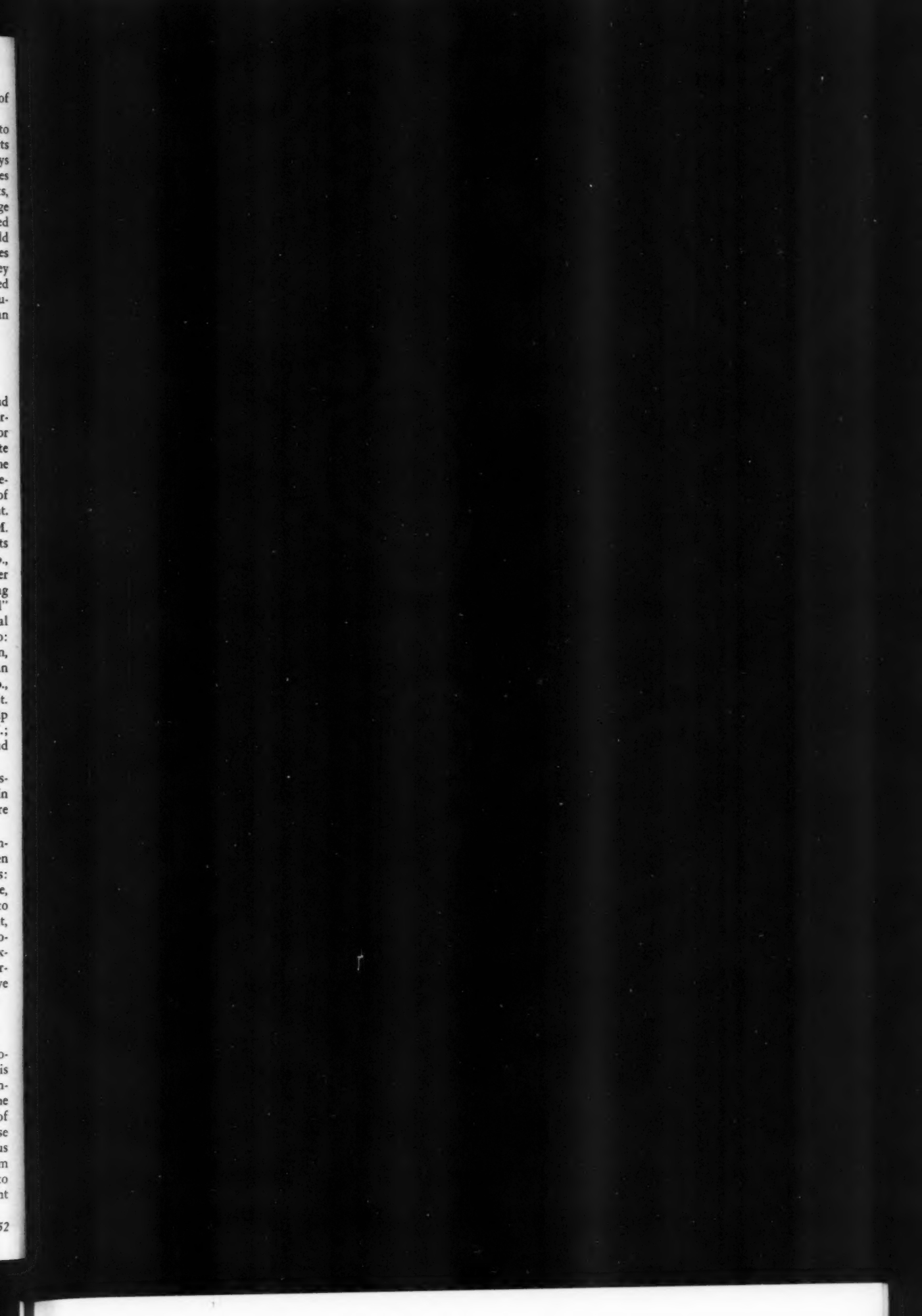
Cited for the first time by A.I.M. were International Cellucotton Products Co., Chicago; Kimberly-Clark Corp., Neenah, Wis., and Northern Paper Mills, Green Bay, while the following were designated "excellently managed" for the second time since the annual award was initiated two years ago: Champion Paper & Fibre Co., Hamilton, Ohio; Crown Zellerbach Corp., San Francisco; Great Northern Paper Co., Boston; International Paper Co., St. Regis Paper Co. and West Virginia Pulp & Paper Co., all of New York, N.Y.; Marathon Corp., Rothschild, Wis., and Scott Paper Co., Chester, Pa.

According to Jackson Martindell, president of the Institute, only 298 firms in the United States and Canada were deemed eligible to receive the awards.

In deciding which companies are entitled to the designation, credits are given for excellence in 10 separate fields: economic function, corporate structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor and executive evaluation. In order to be certified by the Institute, a firm must receive 7,500 points out of a possible 10,000.

Customs Court Cases

That mimeograph paper is not automatically dutiable as a printing paper is described by Warren B. Bullock, manager of the Import Committee of the American Paper Industry, as the effect of a decision by Customs officials in a case involving the importation of various qualities of mimeograph paper from Sweden at Seattle, Wash., claimed to be dutiable as printing paper at 1/5 cent



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per pound and 5 per cent. Seven grades were involved and submitted to representative domestic writing and printing paper mills for their opinions. All the papers were in writing paper sizes. All but one of the samples were held to be dutiable as writing paper at 1½ cents per pound plus 10 per cent for the sizes under 100 square inches (8½ by 11 inches) and at 1½ cents per pound plus 7½ per cent for the larger sizes (8½ by 14 inches). Although the papers were basically for mimeograph use, the quality was such that they readily took pen and ink writing and were therefore held to be of writing paper quality. One sample, not susceptible to use with pen and ink, was classified as printing paper. The claim has been made that all mimeograph papers are dutiable as printing papers because they are used for printing papers in mimeograph machines. The industry opinions, sustained by the officials, were that classification should be based on the character of the paper and not on the use.

Christmas wrappings imported at Portland, Ore., from Sweden have been held to be dutiable at 4½ cents per pound plus 10 per cent as paper with surface design. The officials had thought that the paper might have been decorated by lithography, but industry opinions held to the contrary. The above rate, effective on the Portland importation, is cut in half on future shipments as a result of the Torquay Reciprocal Trade Agreement negotiations.

High grade glassine papers imported from England, but made in Austria, Belgium and France, have been held by Customs officials to have been undervalued about 20 per cent and assessed with duty at the higher value.

Mill Expansion Plans . . . .

250-ton Georgia Mill Planned by Rayonier

Rayonier Inc. has announced plans for the early construction of a new pulp mill at Doctortown, Ga., capable of producing 250 tons per day of purified wood cellulose. A mill site of 530 acres has been purchased, and construction will be started as soon as steel and other materials requiring government allocation are available.

In releasing this announcement, Clyde B. Morgan, president, stated that application has been made to the National Production Authority for a Necessity Certificate and for allocation of the necessary materials. The new mill will provide additional tonnage to meet the growing requirements of Rayonier's customers and at the same time will afford a reserve capacity for the possible manufacture of wood cellulose for military purposes.

Proceeds from the recently announced borrowing of $40 million from the Prudential Insurance Co. of America will be used in part to finance this project, which will constitute an investment in excess of $25 million.

Rayonier is one of the large producers in the United States of purified wood cellulose, a basic raw material used in the manufacture of rayon, tire cord, cellophane, photographic film, and other cellulose derivatives. The company already owns and operates three mills in the State of Washington and one mill in Florida, with combined annual capacity of approximately 430,000 tons. This fifth mill will have annual capacity of 87,000 tons.

A considerable enlargement of Rayonier's capacity is going forward at the present time in a $6 million special construction program at the four existing mills. This construction is expected to be completed in 1952. The Doctortown project is a further extension of the company's long-range expansion program, which has been planned to serve the steadily increasing demand for wood cellulose in the rayon, cellophane, and related industries in the United States and world markets.

An advantageous location for the mill was selected in southeastern Georgia, on the Altamaha River, at a point 38 miles from the sea, in an area where there is an abundant supply of both surface water and ground water. The site in Doctortown, near Jesup, is served by the main line of the Atlantic Coast Line Railroad, with radiating rail connections and highway approaches affording economical transportation of pulpwood from the heavily wooded surrounding area.

Improved Process

The mill will use an improved process that permits the production of superior grades of wood cellulose, primarily for high tenacity yarn applications, such as tire cord, parachute materials, and rubber belting. Flexibility is provided in the mill's design, however, so that it will also be able to produce nitration pulp if necessary for the manufacture of explosives, as well as pulps for special types of paper and for standard textile yarns.

To provide an assured long-term supply of raw material for this new operation, Rayonier has recently enlarged its already substantial wood resources in the South, which had been built up to support production at the Fernandina Division in Florida. Large acreages have been purchased this year, and today the company owns or controls approximately 400,000 acres in southeastern counties of Georgia and northeastern counties of Florida.

Approximately 550 cords of wood will be consumed per day, part of which will be drawn from Rayonier's own holdings of timber, and part will be purchased from local land owners, thereby creating a sizable new market for wood in the area. The mill is designed to use all the local species of pine, as well as the local hardwoods.

Approximately 450 people will be employed to work in the mill itself, and another 400 or 500 people will work in the cutting and transportation of pulpwood.

The Doctortown project will be carried out under the executive direction of R. F. Erickson, vice president in charge of engineering and plant development. The mill's special processing procedures were developed by Rayonier's Research Division under the supervision of Dr. A. N. Parrett, vice president in charge of research and development. Designs for the installation of the processing equipment have been prepared by Rayonier's own engineers, and Ebasco Services, Inc. has been retained as consulting engineers to design the mill structurally.

National Container Opens $1,000,000 Texas Plant

Manufacture of corrugated shipping containers has been started at the $1,000,000 plant recently completed by National Container Corp. in Dallas, Tex. The new facility, a completely integrated box-making operation, represents the 12th such unit for the firm, which is also constructing a multi-million dollar 500-ton-per-day kraft pulp, board and paper mill near Valdosta, Ga.

The Dallas box plant, which replaces a smaller unit, contains more than 90,000 square feet of floor space. A $200,000 corrugating machine, capable of producing box material at the rate of 450 linear feet per minute, will insure southwest manufacturers of a steady supply of corrugated containers.

General manager at the new plant is Thomas M. Holden. Chandler H. Jones is sales manager, while James J. Parks is plant manager.

Great Northern Considers Maine Sulphate Pulp Mill

Great Northern Paper Co. is reported to be exploring the possibility of building a new mill in Maine for the manufacture of sulphate pulp from its extensive hardwood holdings in the state. The firm may reveal some of its plans at the annual stockholders meeting next month.

The company is the largest single timberland owner in Maine, and a large part of its holdings are hardwoods not used in the making of newsprint, the firm's principal product.

WASH-UP AREA in Gardner's recently opened warehouse and locker room building at Middletown, Ohio

ASSEMBLY AREA in new building may be easily divided into training or conference areas

Gardner Opens $300,000 Multi-Purpose Building

Locker rooms, a large assembly hall, and two floors of warehouse space are contained in a new building recently opened by Gardner Board & Carton Co. at Mill 2 in Middletown, Ohio. The structure cost $300,000.

The building features three adjoining locker rooms. Foremen, carton plant and board mill employees have their own separate areas. The rooms, containing 725 lockers and 20 showers, cover 8,300 square feet. Lockers are kept clean and almost odorless by a power ventilation system. To keep maintenance at a minimum, only a small portion of the equipment is on the floor. Most of it is mounted on walls or ceiling. In the wash-up area there are five large circular wash bowls.

A concealed type of lighting, flush with the ceiling, is used. Heat is furnished by a steam pressurized system. Windows are constructed of glass blocks.

The assembly room, which adjoins the locker rooms, is 80 by 82 feet and is designed to hold 1,500 people. By using sliding plastic partitions, the room can be divided into as many as six separate conference and training areas.

The first floor and basement of the building were built for storage use. They provide 332,332 cubic feet of space.

Robert Gair Plans Purchase of American Coating Mills

Owens-Illinois Glass Co., Toledo, has announced that it will sell the manufacturing plants, business and inventories of its American Coating Mills Div. to Robert Gair Co., Inc., New York, N.Y., April 1.

According to Owens-Illinois, the firm will receive about 400,000 shares of Gair common stock, plus a substantial cash consideration for American Coating's mills at Elkhart, Ind., and Middletown, Ohio, and for carton fabricating plants at Elkhart, Chicago, and Grand Rapids, Mich. Owens-Illinois manufacturing operations devoted to corrugated boxes for company products will not be included in the transaction.

Announcement of the sale was made jointly by J. P. Levis, Owens-Illinois chairman, and George E. Dyke, president of Gair. Mr. Dyke declared that the business of American Coating will be operated as a separate division of Gair, under the direction of R. L. Sindeman, president of American Coating, and his staff.

United Board to Install Suction Drum Rolls

United Board & Carton Corp., Syracuse, N.Y., will install suction drum rolls and electrical wet end drives in its three paperboard mills. The new equipment involves an expenditure of $50,000 and is to result in the production of higher quality paperboard. The firm's Thompson, N.Y., mill will be equipped first.

The installation will consist of an electrically driven Beloit suction drum roll. The 20-inch vacuum necessary to operate the roll will be developed by a Roots-Connersville vacuum pump driven by a 75 hp. motor. This pump produces 1660 cfm. at 1160 rpm.

The electrical drive powers the top first press roll, the two bottom helper rolls, and the suction drum roll. This will permit the use of a finer felt, which will result in a better finish board and longer life on the felts at a reduced cost per ton.

Paper Corp. of America Plans $1,000,000 Program

An improvement program costing approximately $1,000,000 is underway at the Cheboygan, Mich., mill of Paper Corp. of America. Included in the project are a 150-ton semichemical pulp mill and a 50-ton-per-day groundwood mill.

Other improvements include the lengthening of wires, installation of new suction presses, rope carriers, winders, drum reels, and the addition of driers so that each machine will have 44. The schedule of improvements also calls for increasing the production on present machines so that eventual output will be 135 tons of paper a day. The firm, which employs 160 workers, plans to manufacture its own chemicals.

Expansion Notes

Olin Industries, Inc.,
of East Alton, Ill., and Frost Lumber Industries, Inc., of Shreveport, La., have announced jointly that their stockholders have approved the merger of the two firms. The deal involves four small railroads and large holdings in three states. An Olin spokesman declared that among Frost holdings were 450,000 acres of heavily forested land that is more than enough to supply—on a perpetual yield basis—a wood pulp mill that Olin plans to build.

American Reinforcement Co.,
Attleboro, Mass., is reported to be planning the construction of a paper plant on a 30-acre industrial site it has purchased in San Francisco. Details are being withheld until the proper certificates of necessity are obtained from the National Production Authority. It will be the firm's first western manufacturing plant, although sales offices have been located in San Francisco.

Midwest Paper Co.,
Marion, Ind., has started preliminary construction work on a large warehouse and office building. The firm lost an extensive storage building by fire last May. Steel allocation for the new construction has been granted by the National Production Authority.

Brunswick Pulp & Paper Co.,
Brunswick, Ga., which recently announced plans for plant expansion, has

been chartered in Georgia, the charter replacing the firm's 1936 Delaware incorporation. The change places the home office in Brunswick and allows consolidation with Timberlands, Inc., a subsidiary formed because Georgia law limits out-of-state corporations to 5,000 acres of land holdings.

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Greensboro, N.C., has acquired controlling interest in Standard Paper Co., Augusta, Ga. The new acquisition brings the number of Dillard divisions to 10 in six cities. All personnel of Standard will be retained.

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According to R. M. Fowler, president of the Newsprint Association of Canada, mills in Canada made about 3,300,000 tons of newsprint annually before the war. Of this total production, 72 per cent was shipped to the United States, while 22 per cent went to overseas countries. He estimated that in 1951 the Canadian manufacturers produced 5,500,000 tons and shipped 87 per cent to the U.S. and less than 7 per cent to overseas countries.

North American Newsprint Output at Record High

North American production of newsprint in 1951 amounted to a record high of 6,641,027 tons, of which 5,516,279 tons were made in Canada (including Newfoundland) and 1,124,748 tons in the United States. The Canadian mills produced 237,694 tons, or 4.5 per cent, more than in 1950, while the output in the United States was 110,045 tons (10.8 per cent) greater than in the previous year. The total continental increase was 347,739 tons, or 5.5 per cent.

Production in Canada during December of 1951 amounted to 435,287 tons and shipments to 461,455 tons. Output in the United States was 91,763 tons and shipments 91,721 tons, making a total North American production for the month of 527,050 tons and shipments of 553,176 tons. For the same month a year ago continental production was 515,906 tons and shipments 536,551 tons. The figures, released by the Newsprint Service Bureau, New York, N.Y., show that the output in December exceeded that of any December on record.

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Ten of the 11 original publisher participants in the mill, which was first operated by its present owners in 1947, have combined with 33 other western publishers in the huge expansion project. The participating publishers control more than 50 newspapers on the Pacific Coast.

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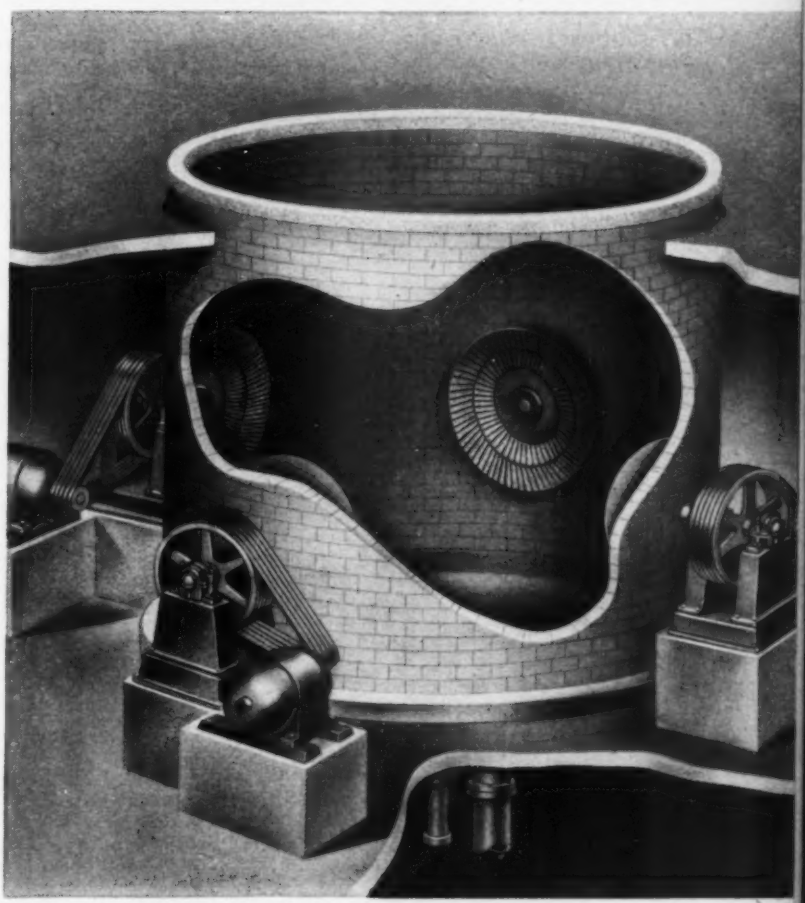
RICE BARTON QuatroPulper

. . . a high production machine . . . ideal for disintegrating pulp, broke or waste paper



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The DynoPeller

is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock toward it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles under a gentle hydraulic pressure. This effective dynomizing action completely disintegrates the stock . . . separating each fiber from its neighbor while maintaining its original length.

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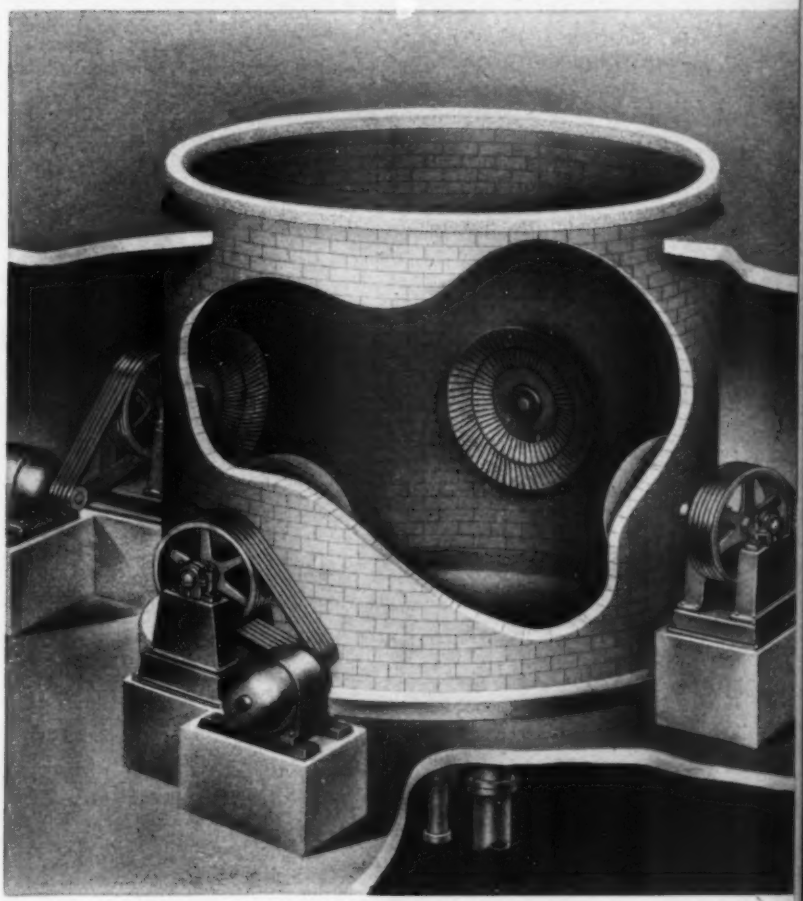


The stock is charged all at one time into the top of the vat. Four DynoPellers (described below) subject it to the vigorous dynomizing action that completely separates each fibre from its neighbor, maintaining its original length. The simple operating principle and design of the QuatroPulper eliminates the "wracking" and grief of other types of pulpers. Because there are few moving parts there is no loss of production time due to repair or adjustment. The QuatroPulper defibers the stock at low cost and produces a high quality slurry quickly and effectively.

The DynoPeller

is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock toward it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles under a gentle hydraulic pressure. This effective dynomizing action completely disintegrates the stock . . . separating each fiber from its neighbor while maintaining its original length.

RICE BARTON *Research Corporation*

WORCESTER 1, MASS.

BR 2-52

while the 33 new participants will own 23 per cent. Productionwise, the original owners will continue to receive the 26,000-ton annual production of the present plant and 62½ per cent of the production of the new section, with both divisions of newsprint being based on the percentage of participation by individual newspapers. The remaining 37½ per cent of the new production will be divided by the 33 new owners on the same basis.

Mr. Baker in his announcement expressed appreciation for the help granted the underttaking by Powell River Paper Co. and Crown Zellerbach Corp. These two firms cooperated in providing technical advice. Production began at Steilacoom May 9, 1947.

International Allocation Plan Apparently Abandoned

Plans for the international allocation of newsprint have apparently been abandoned by the 28-nation International Materials Conference. Although the report of a 14-country committee that has been studying the problem has not been made public, informed officials have been quoted as saying that the group has decided against any formal long-range allocation scheme. Instead, according to reports, a voluntary plan for boosting production while keeping newsprint sale and distribution in private channels will probably be announced.

Officials of the conference have said that the group will probably approve a continuation of emergency allocations to needy countries whenever the situation requires it. Emergency allocations have been made in the past to a dozen nations requiring small amounts to maintain their various publications.

Newsprint in Britain Seen at Price Peak

Belief that the price of newsprint in Britain has reached its peak was expressed recently by F. P. Bishop, general manager of Newsprint Supply Co. A ton of newsprint sells in London for between $182 and $187.60, twice as much as two years ago and seven times greater than prewar.

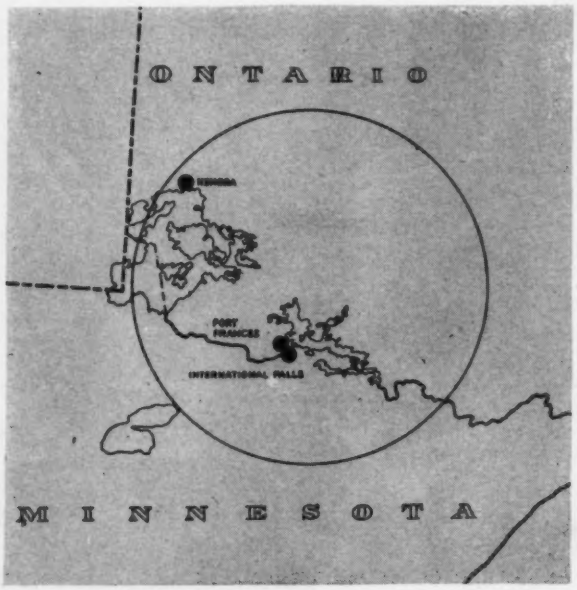
British supplies of newsprint this year will probably be nearly 600,000 tons, about half the prewar supply, according to Mr. Bishop. Even the prewar total would not permit British newspapers to return to the prewar size, since total weekly sales of all newspapers have risen 64 per cent. The most striking circulation gain is in weekly newspapers, which have more than doubled circulation, compared with a 50 per cent increase for daily papers.

Cuba Plans Newsprint Production

It is reported that orders may be placed in the United States in the near future for Cuba's first plant to manufacture newsprint from bagasse.

Seeking national backing for the project, the head of the Agricultural and Industrial Development Bank of Cuba has launched a drive to raise $10,000,000 to $15,000,000. Sponsors of the new industry claim that newsprint produced from cane bagasse by the Joaquin de la Rosa method is as good as that currently used in the U.S.

Lack of Newsprint in Argentina has reduced newspapers to six or eight pages and has curtailed circulation. Blamed for the scarcity is a shortage of foreign exchange with which to buy newsprint. According to industry spokesmen, the end is not in sight, with the commodity to be scarcer than ever in 1952.



MODERN RADIO COMMUNICATION in the wilderness is demonstrated by Mando's FM network serving northern Minnesota and southern Ontario. Map (left) shows the extent of the life-saving system. A. J. Gordon (right), assistant personnel officer and Civil Defense officer, takes charge of the mike in the observation post on top of the Insulite warehouse in International Falls

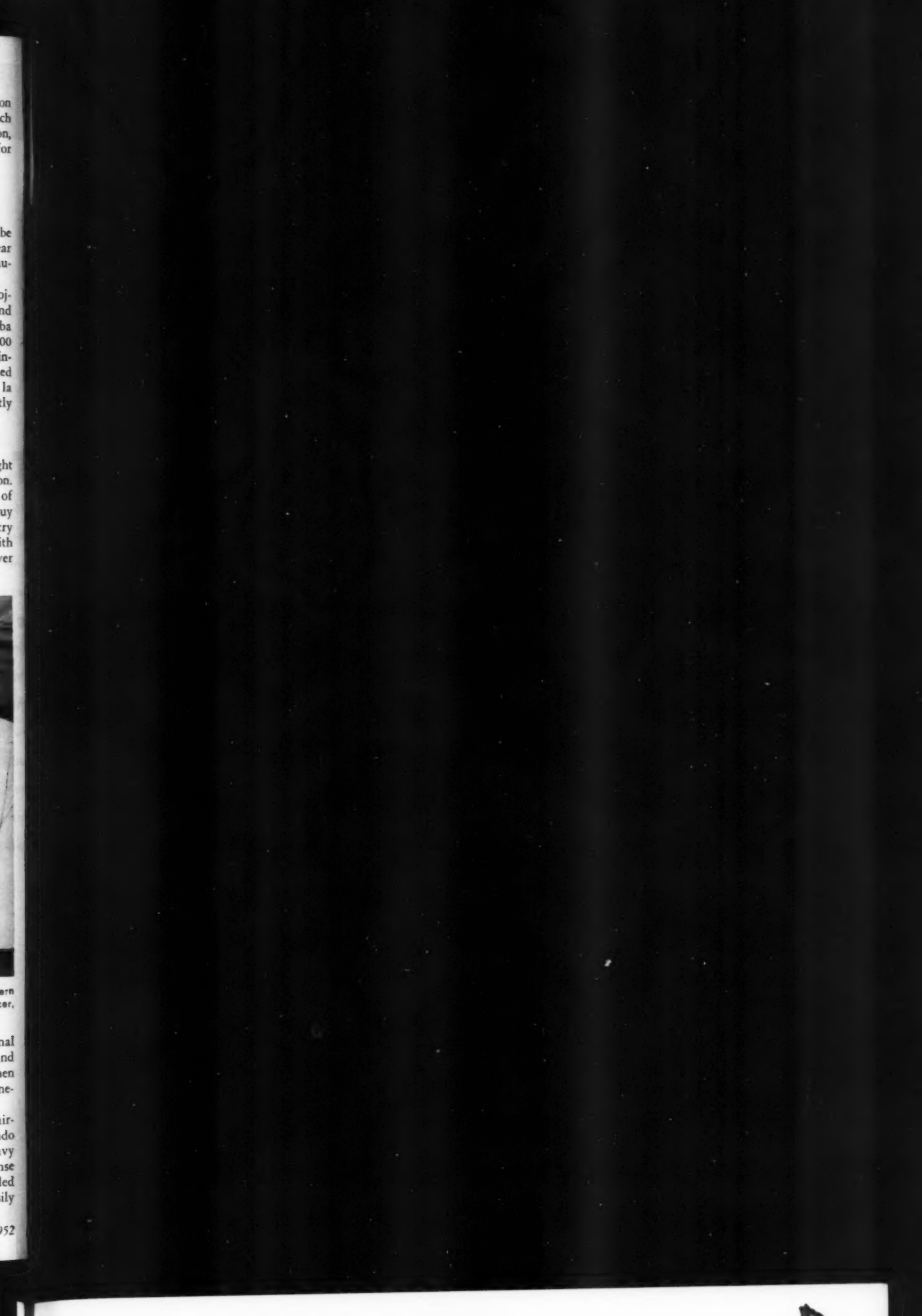
Mando's FM Radio Network Now Serving Defense

Minnesota & Ontario Paper Co.'s FM radio network, which covers the firm's logging operations as a valuable aid in the harvesting of trees, has now been made available to the defense of Canada and the United States.

The system has been incorporated into the Civil Defense organization of Minnesota and has been formally offered to Ontario authorities. Workers whose normal pursuit is the harvesting of pulpwood are now volunteering to serve on a proposed international Civil Defense team.

Loggers working in the wilderness can scan the skies and quickly report by radio the appearance of any aircraft over their remote areas. These warnings can be rapidly flashed over the forest to tall steel towers located at International Falls, Minn., and at Fort Frances and Kenora, Ont. The messages would then be relayed to a filter center at Minneapolis.

In December, during a state-wide aircraft warning exercise, three Mando spotters reported a flight of three Navy Corsairs. According to a Civil Defense official, the woodsmen's reports enabled the Minneapolis filter center to "easily



QUAKER ANNOUNCES NEW

ROLL COVERING SERVICE

AS CLOSE AS YOUR NEAREST QUAKER BRANCH

SAVES TIME...CUTS FREIGHT...ASSURES LOWER COST

For the finest in precision quality and service Quaker now offers you something new in roll covering!

No need to pay excessive freight bills for shipping rolls great distances for recovering, regrinding or crowning. Just ship practically any type of roll to the nearest Quaker branch: Pittsburgh, New York, Cleveland, Chicago, Houston, Atlanta, Detroit, Boston, St. Louis. Quaker's fleet of fast trucks will transport these rolls, free of charge, to Philadelphia—headquarters for the finest in roll covering equipment.

Quaker's specialists in Philadelphia have been covering rolls for more than a quarter of a century and can apply covering to most any size or type of roll. Modern equipment for handling rolls from 6 inches to 36 inches in diameter . . . to 204 inches in length including journals . . . with a maximum weight of 16 tons. Rolls can be covered with crude rubber, neoprenes and other synthetic type construction from "0" P & J reading to "260" or 0-100 "A" shore durometer. Hardness and composition of your present roll covering can be matched to precise specifications by Quaker's laboratory production technicians.

For fast, economical roll covering, grinding or precise crowning service, call your nearest Quaker Rubber branch. You'll find it will save you time, production and money. Write, wire or phone for complete details on this new service.

QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

PHILADELPHIA 24, PA. • BRANCHES IN PRINCIPAL CITIES

REG. U. S. PAT. OFF.

Impco POINTS TA

Now you can keep your black liquor evaporators FREE from this fibrous deposit!

Photographs of actual encrustation of evaporator tubes formed before Waco Filter was installed.

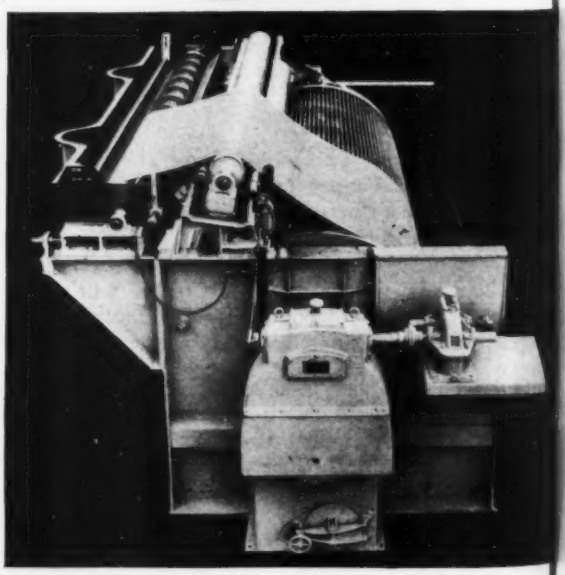
Up to 95% "fines" recovered before evaporation!

The Waco Filter forms its own continuous filter paper through which liquid is filtered for removal of solids. Contaminated filter paper is simultaneously removed.

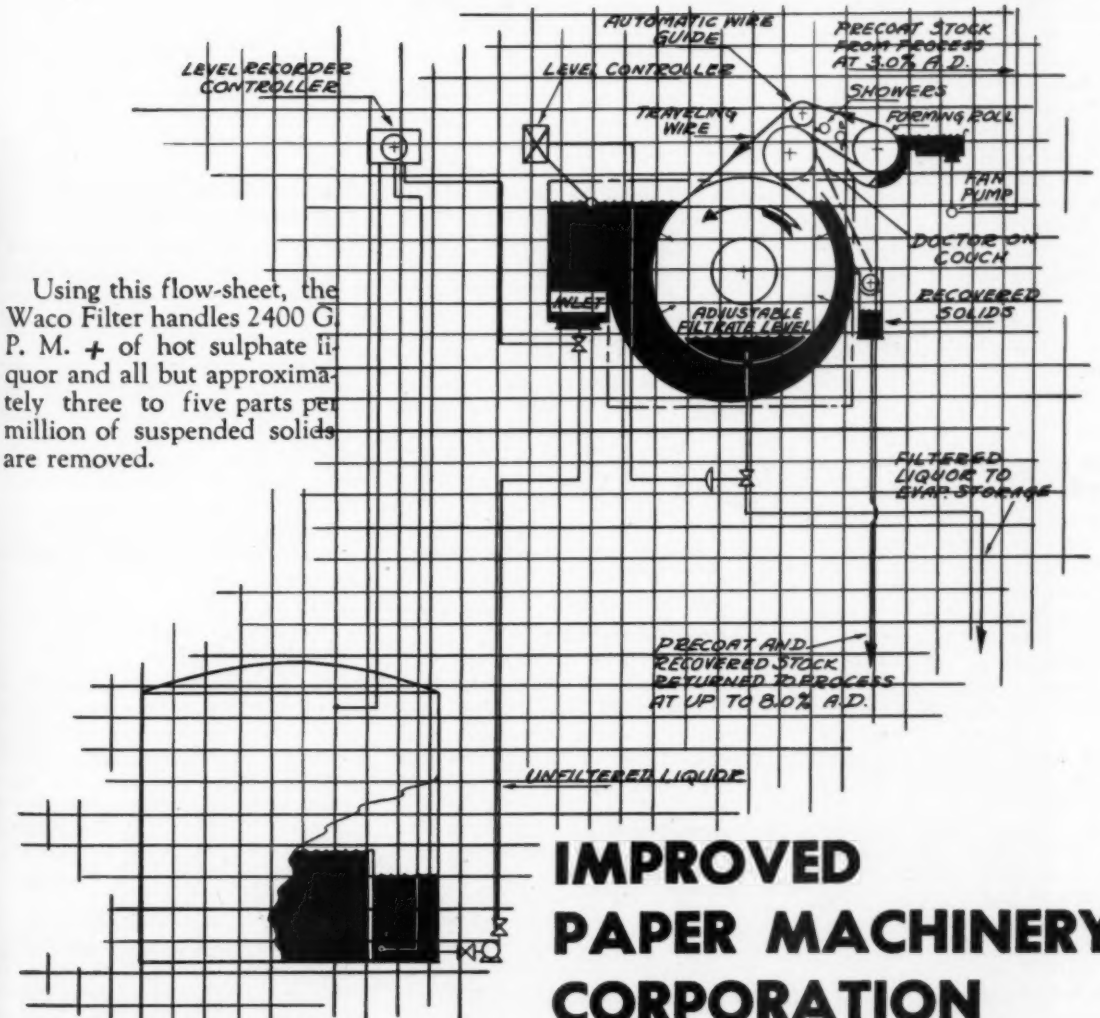
Stock consumption is negligible.

Filtering black liquor is just one job it does well.

Consult us about filtering fresh-water, white water, mill effluents—all mechanical filtration jobs.



ANOTHER WACO FILTER APPLICATION



Using this flow-sheet, the Waco Filter handles 2400 G. P. M. + of hot sulphate liquor and all but approximately three to five parts per million of suspended solids are removed.

Sherbrooke Machineries Limited, Sherbrooke, Quebec, manufacture similar equipment in Canada.

IMPROVED PAPER MACHINERY CORPORATION

NASHUA, NEW HAMPSHIRE

track the visiting planes with considerable accuracy."

The spotter plan is still subject to the approval of Canadian authorities. However, the Minnesota branch is already established as a part of the state-wide ground observer system for reporting the approach of hostile aircraft. The Minnesota network includes a 250-watt station at International Falls and eight 60-watt units in Mando logging camps and forestry establishments in two northern Minnesota counties. Thirteen other radio installations extend 100 miles north of the Canadian border, including towers at Fort Frances and Kenora.

System Used in Emergencies

Besides the network's use in Civil Defense and regular logging operations, the system has rendered service in all sorts of emergencies, ranging from forest fires to the removal of an appendix.

Typical emergency uses of the network include the instance several years ago when a group of men became stranded on a small island during a raging flood. A Mando lake boat equipped with radio was dispatched to the scene. Radio proved to be the margin in a life-and-death race. On another occasion a woodsworker received a painful back injury while working in the Patricia Limits area 90 miles from Kenora. A radio call brought a physician to the Kenora microphone with pain-relieving advice. Meanwhile, a train was halted at Vermilion Bay. The injured man was transported by truck to the train. Within a few hours he was in a Kenora hospital.

Control of Insects and Diseases Stressed by Forest Service

The need for more progress in protecting the nation's forests against insects and disease has been noted by Lyle F. Watts, chief of the U.S. Forest Service, in his annual report to the secretary of agriculture. Millions of board feet of timber badly needed for defense, industry, housing, and home use are lost each year to these scourges of the woodlands.

Insects and diseases cause greater timber loss each year than does fire. During the 10-year period 1934-43, losses from fire averaged 460,000,000 cubic feet of timber a year. During the same period, an estimated 622,000,000 cubic feet were lost to insects and disease.

The report lists bark beetles among the most destructive forest insects. The larvae of these beetles feed under the bark. In sufficient numbers they can kill hundreds of thousands of trees in a single season. One of the most serious infestations of bark beetles is in Colorado, where the Englemann spruce beetle in the past 10 years has killed more than 4 billion board feet of timber on national forest land. This is 16 times greater than was killed by fire during the past 30 years in the entire Rocky Mountain region.

The Forest Service commenced control of the beetle in 1950, using new techniques developed by the Bureau of Entomology and Plant Quarantine. According to the U.S.F.S. report, the work must be continued in the summer of 1952, and follow-up control for several years thereafter will probably be necessary.

Other Pests and Diseases

Other serious pests, according to the report, include such leaf-eating insects as the spruce budworm, tussock moth, larch sawfly, tent caterpillar, and gypsy moth. For the past two years the Forest Service in cooperation with the State of Oregon and private landowners has operated a control project against the spruce budworm. About 2,000,000 acres of infested timber have been successfully treated through aerial spraying. Present estimates are that treatment will be needed on about 1,000,000 additional acres during the next two years.

Additional destructive diseases listed in the annual U.S.F.S. summary include brown spot, which attacks the southern longleaf pine; little leaf disease of shortleaf pine; oak wilt, and pole blight, which is attacking western white pine of pole timber size.

In his recommendations, Mr. Watts declared that more federal research on insects and diseases is badly needed, in addition to well organized systems of detecting infestations and quick counter attacks. As pointed up in the report, good forest management that maintains vigorously growing stands will help considerably in insect and disease control, since healthy trees are more resistant than over-mature ones.

Hamersley Celebrates 75th Anniversary

Hamersley Mfg. Co. of Garfield, N.J., is this year celebrating its 75th anniversary. The firm, manufacturer of glassine, greaseproof, laminated and waxed papers, employs more than 300 persons. Two of the employees, including the president, Walter L. Dawson, have been associated with Hamersley more than 50 years.

The firm was founded by Siegfried Hamersley, a New York City candlemaker who is credited with the invention of waxed paper. He originally conducted the business in a sub-cellar because of the lack of refrigeration.

Following the death of the founder, the concern was operated by his sons, Carl S. and George W. Hamersley. In 1903 the firm became the first paper mill in the United States to manufacture greaseproof paper. The third generation, in the person of Arnold G. Hamersley, is active today as executive vice president.

Survey of Swampy Forest Cuttings Completed in Michigan

Foresters recently completed a field survey of 65 swamp forest cuttings throughout Michigan's Upper Peninsula. Cooperating with the Forest Experiment Station in the project were Bonifas Lumber Co., the Ottawa and Upper Michigan national forests, Escanaba Paper Co., Northern Paper Mills, Cleveland Cliffs Iron Co., and the Michigan Conservation Department.

Purpose of the survey is to determine the kind of forest stand that has resulted from different types of cutting on a variety of swampy sites. The findings will aid in directing future research in the management of the potentially valuable swamp forests into the most promising channels. While many swamp forests have been cut over in this area, only those were examined for which the conditions at the time of cutting were known or could be closely reconstructed.

Mechanical Planters Used Extensively in Georgia

Approximately 80 per cent of the pine seedlings planted in Georgia last season were put in by mechanical planters. This was revealed recently by the Agricultural Extension Service.

A survey showed that approximately 230 mechanical tree planters are currently in operation in the state. Obtained through the leadership of the Fulton National Bank, Georgia Bankers Association, and the cooperation of other banks, the machines are helping to increase interest in reforesting Georgia's idle acres. During 1951 about 36,000,000 pine trees were planted.

Three States Join Tree Farm System

The American Tree Farm System welcomed three new member states as 1951 drew to a close. They were Colorado, Nevada, and Wyoming, all of which came in under the Western Pine Association's banner. Their entry brought the national enrollment to 33. The program is encouraged nationally by American Forest Products Industries, Washington, D.C.

Nevada's first certificates went to Fibreboard Products, Inc., owners of the 12,784-acre Floriston Tree Farm in Washoe County, and to Sierra Pacific Power Co.'s Tahoe-Sierra Tree Farm of 14,460 acres. Only 200 acres of the latter property are in Nevada.

The first tree farm certificate in Colorado went to Broderick Wood Products

COLOR PHOTOGRAPH BY JOHN S. HOLYOKE

LEE PAPER COMPANY, Vicksburg, Michigan, recently started up its new 130″ Beloit machine for the manufacture of high-grade rag-content bond and other fine papers. The first machine for production of this type to be installed in the U. S. in more than 20 years, it is already setting new standards for speed and quality. It was built by Beloit Iron Works at Beloit, Wisconsin.

Early Paris post office. Illustration from Bettmann Archive.

Paper, Printing and the Postal Service

Older than paper, far older than printing is the idea of a postal service. It began in primitive Persia, flourished in ancient Rome. Even through the "Dark Ages," Merchant Guilds carried it on. But a King of France, Louis XIV, in 1653 first extended postal service to the individual. For a sou, the Paris post office would deliver a letter to your private abode.

In America the postal service is inseparably associated with the name and fame of Benjamin Franklin. Under British rule he served 16 years as Deputy and 21 as Postmaster for the Colonies, then in 1775 became the first Postmaster General appointed by the Continental Congress.

Once hand written letters largely made up the contents of the carrier's pouch. But the coming of plentiful paper and the advancement of printing changed everything. Today the United States Post Office handles more than four billion pounds of printed matter, letters and cards each year, as well as seven billion pounds of merchandise wrapped in paper and paper board. Paper, printing and the postal service work together in providing and stimulating the life blood of progress. Supplying those billions of pounds of paper in such infinite variety of purposes is one of the great achievements of the pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper—Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS • *Kenwood Mills* • RENSSELAER, N. Y.

KENWOOD WOOL PRODUCTS

HUYCK *Felts*

Co., Denver, for a 3,200-acre woodland tract in Larimer County. Wyoming's first tree farm is a 240-acre tract in Carbon County owned by N. A. Swenson, coal and woodland operator.

Guaranteed Growth Discussed at Southern Meeting

Officials and foresters representing the South's pulp and paper mills met in Atlanta, Ga., January 16 to consider measures necessary to assure adequate tree growth for their rapidly expanding industry. More than 300 representatives from 11 states attended the meeting, sponsored by the Southern Pulpwood Conservation Association.

H. J. Malsberger, association president, described the conference as "one of the most important ever held in the South." Pulpwood demand in the region will increase an estimated 25 to 40 per cent within two years, according to Mr. Malsberger. Speakers included Earl Porter, Mobile, Ala., manager of the woodlands division of International Paper Co.

New York Expects High Return on Salvage

New York State is expected to net more than $1,000,000 in the salvage of Adirondack forest lands damaged in the "big blow" of November 25, 1950.

The state is contracting with individuals, sawmills, and pulp mills to clear forest areas of fallen or severely damaged trees, according to Arthur S. Hopkins, director of the Division of Lands and Forests of the state conservation department. These salvage operations comprise about 155 projects let to date and covering more than 160,000 acres.

Industry Notes

Extensive Damage
to large quantities of rolled paper was caused by a trash fire which got out of control December 12 at Dixie Container Corp., Richmond, Va.

The Institute of Paper Chemistry,
Appleton, Wis., will hold its 16th annual Executives' Conference May 15 and 16.

West Virginia Pulp & Paper Co.
has warned its stockholders that rising costs and substantial increases in tax liabilities have forced the firm to raise funds from outside sources to help finance its expansion program. It was originally intended to finance new projects out of retained earnings.

Nekoosa-Edwards Paper Co.,
Port Edwards, Wis., has received a "certificate of appreciation" and a letter of citation from the ECA in recognition of the firm's technical assistance to the peoples of the Marshall Plan countries. During the past three years Nepco has been host to several groups of European technicians and specialists who have visited industry in this country to observe modern techniques for efficient production.

American Forest Products Industries
has announced that its Milwaukee office has been closed, and that the Lake States headquarters are being moved to Chicago. J. M. Rottier, Lake States manager for the forest industry educational and information organization, has been transfered to the Washington, D.C., headquarters.

International Paper Co.
has reported that the first shipment of oranges from Florida packed in corrugated boxes arrived in Cairo, Ill., in good condition. This was a part of a nation-wide proving test for this new packaging method.

Kimberly-Clark Corp.
has awarded its research fellowship for special forestry problems to Donald O. Prielipp of Rothschild, Wis. He is a graduate of the Minnesota School of Forestry and will investigate decay in balsam fir.

Pacific Northwest Shipments
of pulp, paper, and paperboard are expected to show an increase of 5.4 per cent in the first quarter of 1952 over the similar period last year, when 13,376 freight cars were moved.

A Carload of Newsprint
was destroyed by fire December 23 when a three-story warehouse in Macon, Mo., was swept by flames. The newsprint was owned by the *Chronicle-Herald*.

A Violent Wastepaper Fire
raced uncontrolled through a large Kensington, Pa., factory building January 4. Most of the building was owned by the eastern division of Thomas Paper Stock Co. One corner, occupied by Almax Paper Co., and another section occupied by Salvage Package Co. were destroyed. At the height of the blaze a wall section of the five-story brick building collapsed.

$2,000,000 in Fine Printing Paper
was destroyed January 11 in a spectacular fire that swept the South Dixie Warehouse in Louisville, Ky. The 6,000 tons of paper was owned by C. T. Dearing Printing Co.

Damage of $3,000,000
has been estimated in a fire that swept the main plant building of Pacific Paperboard Co., Longview, Wash., January 11. The structure, 300 by 600 feet, was leveled by the flames. Four paperboard machines and another for processing paperboard and newsprint were destroyed. Four smaller buildings were saved by firemen who fought the flames three hours before bringing them under control. Cause of the fire was not determined.

Knowlton Bros., Inc.,
Watertown, N.Y., has announced that a wage adjustment involving an increase of approximately 4 cents per hour across the board to meet living costs has been put into effect among its employees.

A General Wage Increase
of 7 cents an hour for all employees of United Board & Carton Co., Lockport, N.Y., retroactive to last March 31, has been approved by the Wage Stabilization Board.

Dixie Container Corp.,
Richmond, Va., has been permitted to put into effect a bonus incentive plan for 66 employees, the adjustment being retroactive to July 23.

A 3-Cent per Hour Increase
has been granted 271 employees of General Box Co., Louisville, Ky., following approval by the Wage Stabilization Board. Those affected are members of the United Paperworkers of America, CIO. The increase is effective as of last May 26. Officials of General Box also announced that the board approved four additional paid holidays, making a total of six.

Atlanta Paper Co.,
Atlanta, Ga., has paid year-end bonuses in excess of $200,000 to its employees. In addition, the firm announced that it has instituted a new profit-sharing pension plan that will be supported 100 per cent by the company. Atlanta Paper has already made its first payment of $100,000 into the fund, which will care for the retirement of employees at the age of 65, based on years of service.

Fines of $100 Each
were imposed January 11 in the Newark, N.J., Superior Court on 10 striking members of the United Paper Workers of America, CIO. The strikers were among 20 who had been charged with contempt after several incidents involving violence at the three plants of Whippany Paperboard Mills at Whippany.

Pay Increases of 7 to 10
cents per hour have been granted 133 members of the International Brotherhood of Papermakers (AF of L) at the E. E. Fairchild Corp., Rochester, N.Y. According to the international representative of Local 616, the new contract

also provides three weeks' vacation, six paid holidays, four hours call time guarantee, and four hours reporting time guarantee. Other features of the agreement include a 30-day reopening clause, leave of absence clause, company-paid insurance, and dues checkoff.

98 Striking Employees halted operations January 11 at the George Co. paper mill in Wellsburg, W. Va. A spokesman for the CIO United Steel Workers local said that the dispute arose over a demand for a job reclassification program to correct alleged inequities.

Mead Corp. Employees received Christmas bonuses totaling $390,000. All employees who entered the armed forces in 1951 received special gifts in addition to the regular cash bonus.

Ryerson Buys Stocks and Plants of Two Northwest Steel Firms

Joseph T. Ryerson & Son, Inc., Chicago, has purchased the stocks and warehouse facilities formerly owned by Seattle Steel Co., Seattle, Wash., and Inland Empire Steel Co. of Seattle and Spokane.

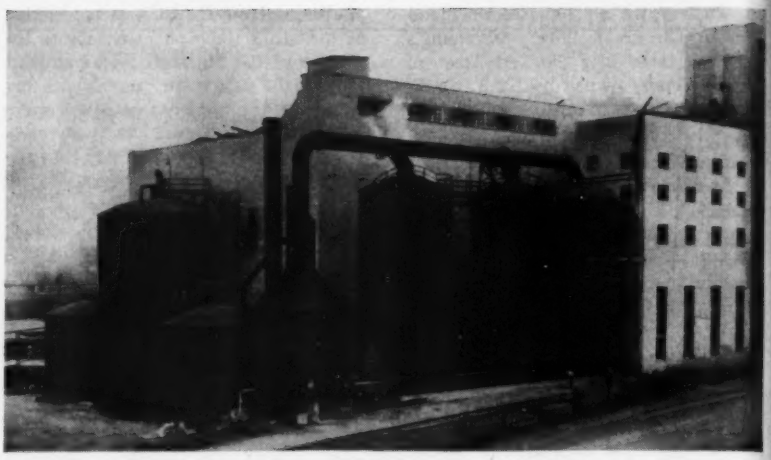
Seattle Steel carried a large tonnage of carbon, alloy and stainless steel in bars, structurals, plates, sheets and tubes; also brass, bronze, copper, aluminum, and other products. It was founded in 1931 and was a leading warehouse distributor in the Northwest.

Inland Empire was active in the reinforcing bar and accessory business in Seattle, serving the construction industry. It also operated a warehousing business in Spokane, serving this market with carbon, alloy, and stainless steel; also, aluminum, copper and brass.

Pennsalt Completes Sales Reorganization

Pennsylvania Salt Mfg. Co., Philadelphia, has completed a reorganization in its sales division. The move was designed to consolidate sales administration while retaining the specialization essential to the firm's interests.

The line organization of the sales division is headed by Russell S. Roeller as general sales manager. Reporting to him are Albert H. Clem as field sales manager, Edwin S. Garverich as manager of technical services, and the eight department sales managers. The planning organization for sales is headed by Arthur G. Turnstall as manager of marketing. Reporting to him are Paul C. Hurley, manager of sales promotion, Franklin A. Lucard, head of sales development, and Malcom J. Harkins as manager of sales control.



NEW DIGESTER BUILDING at the Covington, Va., mill of West Virginia Pulp & Paper Co. The addition was among the major units of consolidation and modernization of the Covington mill that were substantially completed by Rust Engineering Co. during 1951

Rust Engineering has Record Year

During 1951, activities of Rust Engineering Co., Pittsburgh, represented the highest annual volume of business in the 47-year history of the firm. The record volume of construction projects, both completed and under contract, included work on a wide variety of industrial facilities, such as pulp and paper, cement, lumber, catalyst, electric lamps, bricks, felt, steel and superphosphate. Projects for the service industries included plants for sewage and water treatment, in addition to industrial waste treatment and disposal.

Work was carried forward on the major expansion project of Hollingsworth & Whitney Co. at Mobile, Ala.; Crossett Paper Mills, Crossett, Ark., and West Virginia Pulp & Paper Co., Covington, Va.

The new 150-ton per day soda recovery plant was completed for New York & Pennsylvania Co., Johnsonburg, Pa., while work was under way to double the daily capacity of Bird & Son's felt mill at Shreveport, La. The latter mill was completed by Rust early in 1950, and provisions were made during construction for this expansion.

Also on way to completion was the $5,800,000 expansion project of Halifax Paper Co. at its Roanoke Rapids, N.C., plant.

Du Pont May Reduce Cellophane Production

E. I. duPont de Nemours & Co., Wilmington, Del., has informed its customers that its cellophane production will probably be curtailed by approximately 10 per cent as the result of governmental restrictions on the use of elemental sulphur.

According to J. E. Dean, director of sales in the film department, while elemental sulphur is not used directly in the manufacture of cellophane, certain ingredients produced from the mineral (carbon bisulphide and sulphuric acid) are essential in the production of cellophane. There are no substitutes for these materials.

Huyck Buys New Hampshire Firm

F. C. Huyck & Sons (Kenwood Mills), Rensselaer, N.Y., has arranged to acquire Joseph Noone's Sons Co., Peterborough, N.H. The purchase of the assets of the Noone company includes the mill at Peterborough and all the stock of its sales agent, William R. Noone Co. of Boston.

Noone has operated continuously at its present location since 1831 in the production of industrial mechanical cloths. Maj. A. Erland Goyette, head of the Noone firm, will continue his association with the company under its new ownership, but will now devote more of his time to banking and other interests.

Reliance Opens New Ohio Plant

The new $1,800,000 Euclid, Ohio, plant of Reliance Electric & Engineering Co. has been put into operation. A brief plant-opening ceremony was held for executives, employees and guests.

The plant is located at 24701 Euclid Ave. on a 65-acre tract. Built in nine months, the factory is a single-story structure 442 feet in length and 352 feet wide. The total floor area is 133,000 square feet. The plant replaces two units operated by Reliance on East 152nd St.

Hooker Announces $5 Million Plant Expansion Program

Plans for a $5,000,000 plant expansion program have been announced by Hook-

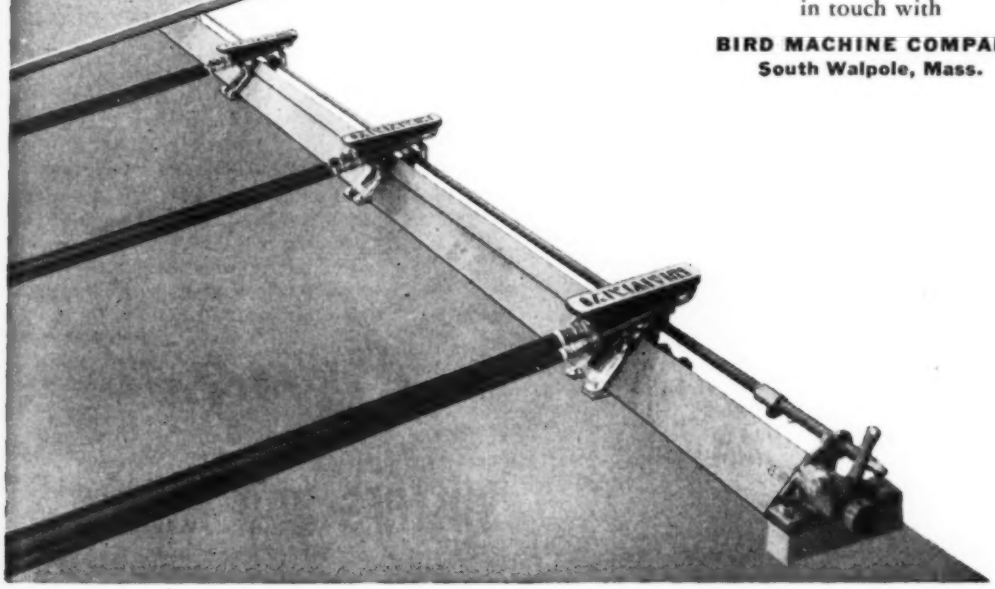
PUT VICKERY FELT CONDITIONERS UNDER YOUR FAST-RUNNING PRESS FELTS

and you'll make

more paper per day — no mid-week shutdowns for felt wash-ups

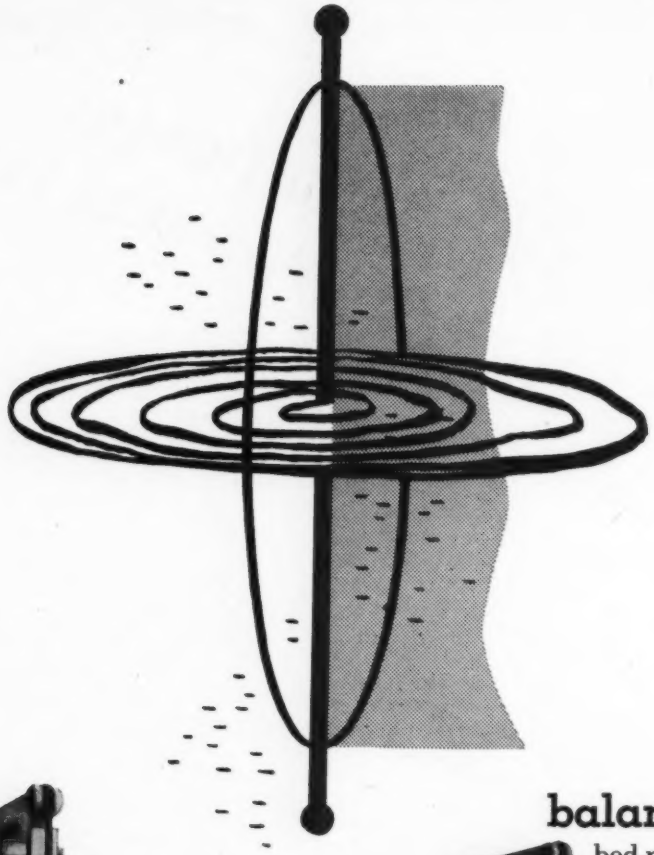
better paper — uniform finish and uniform moisture content of the sheet as it leaves the presses

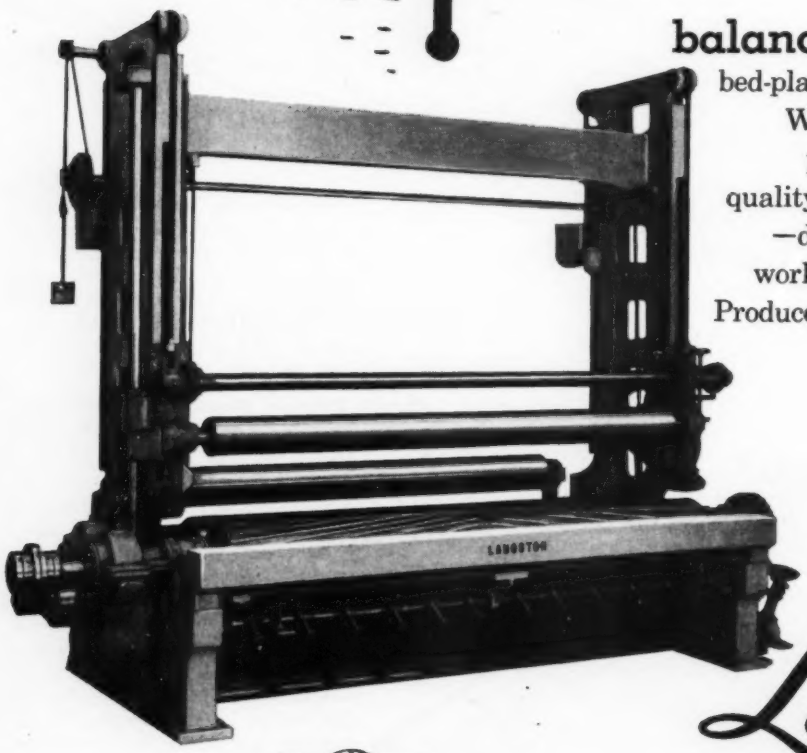
lower cost paper — maximum water removal at the presses instead of at the dryers where it costs ten times as much, increased machine output, reducing unit production cost.



For layouts and estimates, get in touch with

BIRD MACHINE COMPANY
South Walpole, Mass.





balance Substantially built from bed-plate up, Langston Slitters and Winders provide the balanced power that produces highest quality rolls. Shown is Type "DA" —designed for very heavy duty work in widths from 92" and up. Produces top quality rolls at speeds up to 3500 feet per minute.

Langston

slitters and winders

SAMUEL M. LANGSTON COMPANY
CAMDEN, N. J.

er Electrochemical Co. The firm is to begin immediately on a large construction operation at its Tacoma, Wash., plant to increase its chlorine and caustic soda output for the pulp and paper industries of the Northwest.

Hooker recently arranged for the purchase of a substantial acreage from the Tacoma Port Authority, and dredging operations will provide deep water facilities for shipping chlorine and caustic soda by barge. This additional land is being acquired to provide for continued expansion, which the company anticipates.

Whitney Chain Co.,
Hartford, Conn., recently sent two top sales executives on a "rapid-fire" cross-country tour. J. W. Anderson, vice president, and H. W. Beder, general sales manager, conducted sales meetings in San Francisco, Dallas, Chicago, Atlanta, and Philadelphia in the span of one

J. W. Anderson

H. W. Beder

week. The objective of the meetings was to step up customer service during a period of material shortages and governmental controls through supplying the firm's sales force with complete data on the effect of Whitney's current plant expansion program and the use of its new sales service plan.

Hyster Co.,
held open house December 15 on the occasion of the formal opening of its new general assembly building at Portland, Ore.

Chicago Metal Hose Corp.,
on the occasion of its 50th anniversary, became Flexonics Corp. According to the firm, the change makes the corporate name more representative of the broad scope of company activities. Flexonics is now building its sixth manufacturing plant in Memphis, Tenn.

Whitney Chain Co.,
Hartford, Conn., has announced that construction is progressing rapidly on a one-story plant addition. The new building contains approximately 10,000 square feet of additional floor space, which is to be devoted to the manufacture of fabricated steel sprockets and large pitch roller and conveyor chains

Audenried Whittemore L. G. Durant R. G. Goodwin

Paper & Industrial Appliances Changes Name

PANDIA Inc. is the new company name of Paper & Industrial Appliances, Inc., New York, N.Y. Since the name PANDIA has come into wide use among customers and among other members of the industry, company officials voted that the new title be adopted for permanent use.

The firm is best known for its work in the development of continuous cooking. It has introduced two pieces of equipment well known in the industry—the Chemi-Pulper and the Morley continuous pulper. PANDIA is also responsible for the design of the Brammer recording consistency control.

PANDIA has been announced as a change in name only. There will be no alteration in future policies, organization or management. Officers are as follows: Audenried Whittemore, president; Leonard G. Durant, vice president, and R. G. Goodwin, director of sales engineering.

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now in great demand by industry. New heavy presses ranging from 280 to 400 tons are to be installed.

Babcock & Wilcox Co.'s
Tubular Products Div., Beaver Falls, Pa., has announced that seamless stainless steel tubing was produced on the new hot extrusion facilities for the first time in December. The B&W plant is the first in the United States, designed specifically to produce stainless steel tubing by the "Ugine-Sejournet" extrusion process, to be placed in actual operation. The process, according to the firm's vice president, makes it possible to extrude hollow and solid sections of metals which forge with great difficulty.

Tremco Mfg. Co.,
Cleveland, has officially opened the $600,000 Toronto plant operated by Tremco Mfg. Co. (Canada) Ltd. The new structure replaces the firm's original Toronto plant, which was erected in 1931.

Rocke International Corp.,
New York, N.Y., export department of Lynch Corp., is being expanded for the foreign marketing of Lynch's Toledomade packaging machinery. Rocke International formerly conducted the foreign sales of Lynch's PAR refrigeration condensing unit line.

Sharples Chemicals, Inc.,
has combined with Pennsylvania Salt Mfg. Co., Philadelphia, through an exchange of common stock. For the present, Sharples will continue to operate as a separate unit of Pennsalt, with, however, an exchange of technical information and coordination of some policies.

Warren Steam Pump Co.,
Warren, Mass., announces that all business formerly transacted through the office of Parkman A. Collins Co., Boston, is being handled by Warren offices at 6 Leonard St. Parkman A. Collins has been appointed district manager in charge.

Hamilton Laboratories, Inc.,
is a recently formed corporation with headquarters at Wood-Ridge, Md., to market a complete line of specialty organo mercurials and medical phenyl mercuric compounds. Hamilton Laboratories has purchased the patents and trade marks of Hamilton Laboratories, Inc., of Asheville, N.C., which corporation is being dissolved.

Underwriters' Laboratories, Inc.,
has organized representatives of the sprinkler manufacturing industry into a new Industry Advisory Conference. The move was designed to advance the science of fire protection. Conference members will serve as consultants, making available the experience and technical knowledge of the industry to augment the facilities of the laboratory.

Eutectic Welding Alloys Corp.,
Flushing, N.Y., has completed construc-

U. S. Paper and Paperboard Production

	Nov. 1951 (tons)	Oct. 1951 (tons)	Nov. 1950 (tons)	Total 1950 (1,000 tons)	Total 1945 (1,000 tons)
Paper and Board, total	2,047,562	2,219,707	2,193,467	24,300	17,371
Paper, total	989,943	1,043,771	932,435	10,679	7,574
Newsprint	92,674	97,613	85,326	1,017	725
Groundwood paper (uncoated)	68,052	74,119	62,799	694	636
Printing and converting (coated)	92,221	96,131	90,100	1,015	1,501*
Book paper (uncoated)	137,621	142,911	138,233	1,577	
Fine paper (writing, cover, and text, bristols, thin paper and other)	122,649	123,623	109,380	1,223	1,001
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment and other)	322,134	324,031	292,311	3,383	2,403
Special industrial paper	35,204	38,749	23,848	316	238
Sanitary paper	90,709	114,936	97,759	1,108	824
Tissue paper	19,404	21,578	21,351	241	157
Absorbent paper	9,275	10,080	11,328	105	89
Paperboard, total	846,579	928,055	1,001,554†	10,804	7,907
Containerboard, total	466,125	513,604	524,314	5,646	4,131
Liners	313,988	347,869	346,489	3,690	
Corrugating material	132,741	145,261	147,490	1,637	
Container chip	19,396	20,474	30,335	320	
Bending board (folding boxboard)	236,359	260,049	(1)	2,368	2,092
Nonbending board (set-up boxboard)	59,268	63,046	(1)	641	721
Cardboard	4,957	6,744	7,156	77	71
All other paperboard	79,870	84,612	188,234[2]	2,071	891
Wet machine board	9,738	11,329	13,258	144	112
Construction paper and board, total	201,302	236,552	246,220	2,673	1,778
Building paper and insulation	97,758	121,876	128,079	1,414	883
Hardboard and insulating board	103,544	114,676	118,141	1,259	895

(*) Total for 1945, combining printing and converting paper and book paper. (†) Data for "Other bending board," "Other nonbending board," and "Special paperboard stock" are not available separately. The total for these grades for November 1951 is 188,234 tons. This figure is included in the "Paperboard" total. (1) Data not available due to revision of classifications. (2) Figure includes "Other bending board" and "Other nonbending board."

Source: U. S. Department of Commerce.

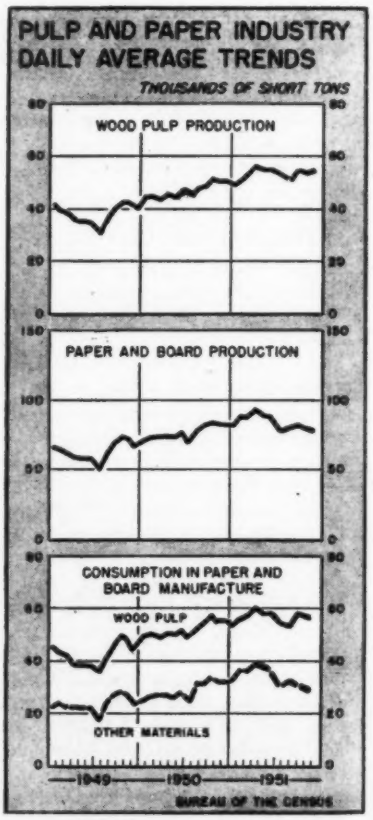
November Pulp, Paper and Board Production

Paper and board production during November amounted to 2,047,562 tons, according to a report released by the Bureau of the Census. This is 7 per cent less than the tonnage produced in November a year ago. In terms of production base capacity, the industry operated at 75.2 per cent in November, with the paper and paperboard sections operating at 87.9 and 66.1 per cent, respectively. The comparable ratios for October were: Total, 78.5 per cent; paper, 88.9 per cent, and paperboard 70.1 per cent.

Pulpwood receipts at the mills during the month were 2,172,866 cords. Consumption at 2,308,333 cords was greater than receipts, resulting in a 3 per cent month-end inventory decrease to 4,977,273 cords.

Wood pulp production during November amounted to 1,414,965 tons. In terms of production base capacity, pulp production ran at 86.6 per cent, the same level as in October.

Wood pulp inventories at the end of November at the paper and board mills were 495,913 tons, as compared to 489,746 tons reported at the end of October. Month-end stock at pulp mills decreased about 1 per cent to 100,927 tons.



tion of a wing to house two new research laboratories. A special staff of research chemists and physicists will use the facilities to develop new welding alloys, utilizing fewer critical metals in today's shortage-burdened market.

Pennsylvania Salt Mfg. Co., Philadelphia, has announced that it will add new facilities, including an electrolytic chlorine-caustic soda unit, to its Calvert City, Ky., works. The cost of the expansion has been estimated at $8,000,000. Addition of the new unit will combine at one works four basic chemicals —hydrofluoric acid, sulphuric acid, chlorine and caustic soda, the first combination of these four products at one works in the United States.

Acme Steel Co., Chicago, has announced the formation and organization of the Acme Steel Products Division. The new division is to operate and function as an independent sales and distributing company for steel strappings, tools and accessories, stitching wire and equipment, as well as other related industrial strip steel products. President of the new division is John G. Bucuss, former general manager of the strapping division. Vice president and general sales manager is Percy L. Dafoe, previously central area manager.

Merritt-Chapman & Scott Corp., New York, N.Y., has announced the establishment of an office at Dallas, Texas. In charge of the construction firm's operations in the area is J. B. Allinson.

Brown Instruments Division of Minneapolis-Honeywell Regulator Co., Philadelphia, started its first courses in instrument maintenance and repair to be held in 1952 on January 7. A large part of the six months' training for the second semester of the 1951-52 season will be for the benefit of Honeywell customers men. The schedule is to be divided into study periods of various lengths. Included are to be studies in pyrometry and electronic potentiometers, pneumatic control and transmission, flow meters, thermometers, pressure gauges and hygrometers, millivoltmeter-type pyrometers, electrically-operated automatic control, etc.

LARGE FLORIDA KRAFT MILL

Installs 7 More HORTON DIGESTERS

These 10 ft. 6 in. diam. by 40 ft. Horton digesters are shown ready for shipment from our Birmingham, Alabama plant to the St. Regis Paper Company mill at Cantonment, Fla. They were built in accordance with Paragraph U-68 of the ASME Code for Unfired Pressure Vessels.

The St. Regis Paper Company's plant at Cantonment, Fla., is the world's largest completely integrated multi-wall bag operation. It includes two complete kraft pulp and paper mills plus a bag plant making practically all types of multi-wall bags, sugar pockets and shipping container bags to be used for filled sugar pockets. Kraft paper capacity is 225,000 tons per year.

Recently a large expansion program was inaugurated which includes seven new Horton digesters, a blow tank, and an accumulator.

The new digesters, 10 ft. 6 in. diam. by 40 ft. high, have been installed to supplement five existing Horton digesters of the same size. Each of the 12 digesters have a capacity of 2700 cu. ft. and yield 9 tons of pulp per blow. An extension to the digester building has been built to house the 12 digesters arranged in a single line.

The new blow tank—24 ft. in diam. with a straight side height of 25 ft. and a bottom cone height of 18¾ ft.—is identical with the original installation which we built in 1941. It has a capacity of two blows or about 18 tons of pulp at 10 per cent consistency.

The Horton accumulator—20 ft. in diam. with a straight side height of 30 ft.—is included in the blow heat recovery system.

These steel tank and plate work installations further emphasize the growing acceptance of Horton digesters, blow tanks, accumulators, Marx Savealls and storage tanks, by the nation's pulp and paper industry.

Our facilities for designing, fabricating and erecting steel plate structure are *complete*. We build tanks from non-corrosive metals, or we can furnish corrosion resistant lining whenever mill conditions require it. We have equipment for stress relieving and x-raying—and recently we have enlarged our facilities for pickling and painting fabricated steel plates and shapes by the Phoscote Process. This process is an excellent method of increasing the life of Horton structures.

Our four large plants—Birmingham, Chicago, Salt Lake City and Greenville, Pa., are strategically located to provide reliable efficient service to the paper industry.

Write our nearest office for complete information or quotations. There is no obligation.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building
Washington 6, D.C.....1138 Cafritz Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

from pulp logs

to paper

CHAIN BELT REX COMPANY®

EQUIPMENT CUTS HANDLING COSTS

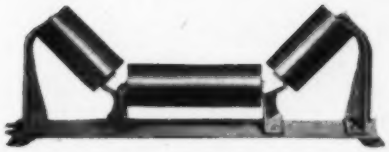
When you select your equipment from the complete Chain Belt Line, you're sure to get equipment which is best suited to your particular applications. If you need chain, you won't be paying for unnecessary chain strength, nor will you be penalized by premature chain failures. You'll get the one that is best for your mill. If you're interested in belt idlers, bucket elevators, spray nozzles or a complete conveying system, you have a similar wide range of selection.

The illustrations on these pages give you some idea of the wide variety of choice that Chain Belt offers you. Your Rex Field Sales Engineer is specially trained to help you in your selection. Call him today, or for complete information write for Bulletin 52-51. Chain Belt Company, 4714 W. Greenfield Ave., Milwaukee 1, Wis.

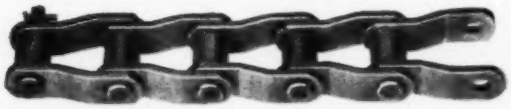
REX

BALDWIN-REX®

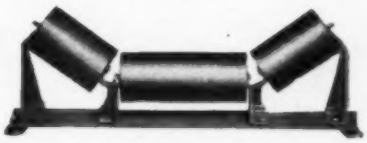
REX® COMBINATION DUROBAR® CHAIN has inside block links of malleable iron or Rex Z-Metal, and side bars of high carbon steel. These husky chains are great favorites for all types of conveyor service in pulp and paper mills. Eccentric barrel construction makes for better sprocket action and greatly reduces chain wear.



REX WOOD CHIP IDLERS are sloped to a steep 45° angle to greatly increase belt capacity. Chips can be piled higher and loaded closer to the belt edge without fear of spillage. Have same long-life design features as Rex standard idlers.



REX CHABELCO® STEEL CHAIN combines relatively light weight with high strength. It is used in both drive and conveyor service . . . can handle heavy loads and withstand severe shock and vibration. For those really tough jobs, you can't beat Rex Chabelco.



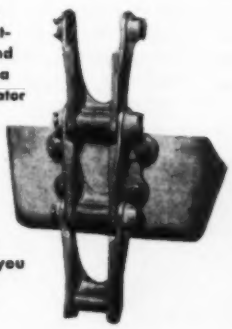
REX STANDARD TROUGHING IDLERS are used for wood chip, bark and pulp handling. Roller or ball bearing equipped interchangeable rolls are supported in brackets of unbreakable malleable iron. Triple labyrinth grease seal keeps grease in . . . dirt out.

BALDWIN-REX® ROLLER CHAIN is a high strength precision steel chain suitable for high speed drive service. It is available in single, double, triple and quadruple strand in a complete range of sizes and strengths to suit every driving requirement. Pitch range is from ¼" to 2½".

REX RETURN IDLERS are of the dead shaft type and are of the same rugged construction as Rex Troughing Idlers. Positive grease seal assures smooth operation through years of continuous service. Rex also makes flat belt idlers, impact idlers, self-aligning idlers and spiral return idlers.

REX FLAT SPRAY NOZZLES are ideal for cleaning logs as they emerge from woodyard or log pond. Their hard-hitting, knife-like sprays of water effectively remove sand, gravel, dirt and grit from logs. Special design permits maximum impact value with low water consumption.

REX BUCKET ELEVATORS are widely used for elevating wood chips, refuse and similar material. There is a Rex Standard Bucket Elevator to meet virtually every requirement of the pulp and paper industry. All major components . . . buckets, chains, sprockets, housing, etc. . . . are manufactured by Chain Belt Co., assuring you a uniform, reliable, easy to maintain unit.



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Distributors in all principal cities in the United States and abroad

Fig. 1—Machine room from dry end; overhead lighting system of three-lamp slimline fluorescent units supplies an average of 25 footcandles maintained; note supplementary angle units along the wall and localized lighting on the rolls

Improved production, less fatigue, improved efficiency result from . . .

Planned lighting at Marathon

J. L. TUGMAN
Lamp Div., General Electric Co.

THE RELATIONSHIP OF LIGHT and sight to paper as a finished product carries on a necessary connection that began when the raw materials entered the paper making process. Progressively, as pulp develops it must satisfy visual inspections of increasing importance. How it looks, which is to say how it reflects light, is the elementary test of fitness. People who work with it, therefore, must be able to see the material clearly and accurately, and a paper mill with better than average lighting for the industry makes news.

Marathon Corp. at Rothschild, Wis., has gained much satisfaction for its management, employes and stockholders by installing a lighting system planned specifically for its plant. As industrial levels go today, Marathon has been conservative in its use of illumination. Nevertheless, the actual conditions produced by the installation are definitely superior in the industry.

For one thing, management states that production performance at night compares favorably with the daytime operation in terms of quality. What this means is that the artificial lighting is good enough to permit quality control with certainty and speed. The quantity of light and the proper color characteristics are provided by the new system. Fundamentals of lighting science have been carefully observed in the plan of illumination. Light is delivered to the work plane in sufficient quantity so that workers can make visual inspections accurately and as fast as the process demands.

Besides this initial necessity of quantity of light, there are the more critical visual determinations dependent on and served by the color quality of light. Anyone who has weighed the difficulties of matching the varieties of white sheets with those of pink or blue or yellow tones will realize the significance of getting the right light for the job. Even daylight varies widely, and artificial sources may be too red or too blue. In the rami-

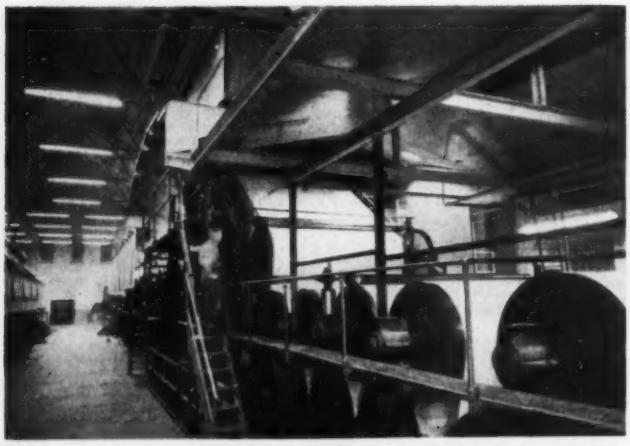

Fig. 2—Light produced from the wall and localized units is reflected by the paper as it runs through the dryers

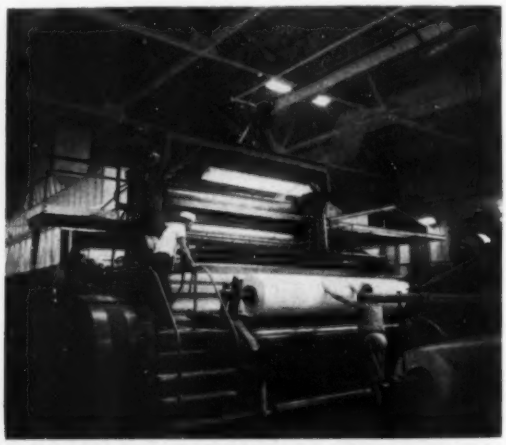

Fig. 3—A close-up of the machines at an inspection point; with 150 footcandles here the task of seeing can be just and accurate

fications of quality control in paper making there are many special problems involving color discrimination (some of them, doubtless, much more complex than Marathon Corp. had to meet). For any of these there is no longer any reason for reliance on daylight. From the lamps from which he may choose the illuminating engineer can usually provide a more dependable system with artificial sources. In general, lamps which have color quality with balanced components of white light satisfy many inspection problems.

In the Marathon installation fluorescent lamps were used throughout. Slimline 96"T12 fluorescent lamps of the standard cool white type were employed.

The system is comprised of transverse rows of three-lamp industrial units in the main overhead portion of the installation. Units are spaced 2 feet apart in rows, and rows are spaced 18 feet on centers with a mounting height of 25 feet 9 inches. A basic average level of 25 foot-candles is delivered on the machines and through the center of the plant. This general level is slightly less near the walls. Supplementary lighting directly over inspection areas and for work positions along the walls builds up the quantity of light at the critical points to as much as 150 footcandles.

A careful maintenance schedule is in operation whereby lamps are group replaced once a year, and fixtures are cleaned twice a year. This policy makes a great difference in the satisfaction the general lighting provides. Dirty lamps and reflectors, unmaintained in typical plants, produce no more than 38 per cent of their potential light output.

Since Marathon Corp. operates its plant 20 hours a day, seven days a week, it naturally seeks to minimize the possibilities of time lost through equipment breakdowns. Lighting, without which operations could not proceed at all, is recognized as an all-important tool. In terms of labor cost and industrial relations generally, light is the number one production tool. Marathon respects it accordingly—especially in the night shift. Resident Manager R. H. Kelly says, "I have talked to our personnel, and they feel that fatigue in the late morning hours is greatly reduced."

Special aspects of the Marathon installation are the angle mounting of units along the wall and the series sequence operation of two lamps in each of the three lamp units. Four transformers feed the system, with alternate rows so serviced that if one transformer goes out only a quarter of the lamps are unlighted. L. J. Snapp, whose contracting company put in the installation, worked out the final details of the installation. The original recommendation, basis for the system, was made by Ben F. Avery, G-E district engineer in Milwaukee.

Chlorine-loading operation at Hooker's Niagara Falls plant

Chlorine handling in pulp mills

E. L. CROWLEY*
Pulp and Paper Div., Infilco Inc.

Any text book on inorganic chemistry will give the history of chlorine as well as a rather complete discussion of its physical and chemical properties. Further information of a more specialized nature can be found in booklets prepared by indivdual manufacturers of chlorine and by the Chlorine Institute Inc. This information includes such items as methods of chlorine shipment, handling of chlorine containers, and general safety precautions.

It has been suggested that some of the more specific pulp mill chlorine handling methods be discussed. The information included should not be put into practice without first consulting a chlorine supplier.

Chlorine storage and unloading

The first problem encountered by a consumer of chlorine is the track or spur for spotting the cars for unloading. Many things should be considered. One is the type of process that will be using the chlorine. If a batch system is in use, one track is all that will be required. Two cars may be connected at a time and when one is empty it can be disconnected and pulled out without causing loss of production. It is often recommended that when either car is moved, both are disconnected to eliminate any chance of a switching accident. For a continuous system of pulp bleaching, where cutting off the chlorine supply would result in sub-standard pulp, a twin spur may be used. One car supplies the plant, while the second car is ready for use when the first one is empty.

Hooker Electrochemical Co. has developed a very simple method for indicating an empty chlorine car. It consists of a loop in the pipe line which when full of liquid chlorine breaks an electrical circuit in a mercury switch. When the liquid is replaced with gas the loop raises, completing the circuit through the mercury switch, which causes a light in the plant control room to go on. By changing two valves, liquid chlorine is restored to the system without loss of chlorine pressure.

For either of these types of car spotting, single or double, a dead end spur to be used for *nothing* but chlorine cars should be provided if possible. A derail or lock switch should be used and in place at all times except when switching out empty cars. The tracks might have a slight slope toward the bumper but in any case the brake should be set and wheels blocked to hold the car in place.

However, it is often recommended that the track beneath the chlorine cars should be as nearly level as possible so that all the liquid chlorine can be re-

*At the time this article was written Mr. Crowley was bleach plant superintendent at Northwest Paper Co., Cloquet, Minn.

moved as a liquid, rather than gas.

A chlorine car has four valves in the dome so arranged that either of the two valves toward the sides of the car will deliver gaseous chlorine, while the valves toward the ends of the car will deliver liquid chlorine. The selection of gas or liquid chlorine will be a matter of the individual consumers needs.

There are different methods used to hook a car to the mill lines. These include flexible metal hose of monel, stainless or copper, copper figure S-bends or flexible elbows (Barco type). It has been found that 1-in. copper S-bends with two bolt ammonia couplings give a more satisfactory performance. Since all the valves on the chlorine cars are 1-in. size, the piping from the valves into the plant need be no larger. All piping from the valve on the car to the copper S-bend and from the copper S-bend to the mill should be extra heavy iron. As long as chlorine is dry it can be handled in iron pipe with iron valves. However, *it must be dry.*

Single unit chlorine cars are of three sizes, holding 16.3 tons, 30 tons and 55 tons. These cars are leased by the customer as it is not permissible to transfer chlorine from one vessel (a tank car) to another (a storage vessel). The cars are under pressure, ranging from approximately 140 psig. in the summer to as low as 40 psig. in some cold sections of the country in winter.

To move the chlorine into the mill it is often necessary to provide a padding of air of sufficient pressure to maintain a uniform flow of chlorine in all ranges of temperature. The pressure of the air pad is determined by the length and elevation of the chlorine line and by the volume of chlorine consumed. On ICC cars of class 105A300 the safety valve is set for 180 psig. (may be as high as 225 psig.), while on ICC cars of class 105A500 the safety valve is vapor tight at 300 psig. To be able to handle all cars with safety it is desirable to set the compressor supplying air to the car at not over 175 psig.

Compressed air supply

A small compressor for padding the chlorine car only is used. This should be entirely independent of the mill air supply. At Northwest Paper Co., a 1½ horsepower air compressor with a 6.5 cfm. piston displacement will supply enough 175 psig. air to move 2000 lb. of chlorine into the mill every hour. Rough calculations based on pressure difference to the chlorine car, the efficiency of the compressor, etc., indicate that this unit could go as high as 2500 lb. of chlorine per hour. It may actually take care of that much, but we know that the 2000 lb. can be handled without trouble.

The air must be dried and filtered before reaching the car. Any moisture will combine with chlorine to form hydrochloric acid, which will corrode the car and the mill pipe lines. Any dirt, oil or other impurites will carry over with the chlorine to foul pipe lines and finally the product being treated. There are several commercial air drying units available that are very compact, nearly automatic, and that will produce safe air. It is necessary to install a good check valve in the air line to prevent back up of chlorine into the air dryer, thus contaminating the drying media.

If liquid chlorine is to be used in the mill, the air is piped into one of the gas valves in the dome of the car. A ⅜-inch, copper tube works nicely on the final hook up, as it is flexible enough to bend with safety to any size car. The time required to bring the car up to the necessary pressure is dependent on the volume of the air compressor, the outside temperature (since the colder the temperature, the lower the pressure), and on the final pressure required in the car.

Pressure gages—protected by a diaphragm of silver—are employed on the air line after the dryer and on the chlorine line from the car. These gages make it possible to rapidly diagnose failure of chlorine flow. A pressure gage on the liquid line before it enters the evaporator is also very helpful.

Chlorine evaporators

Liquid chlorine may be evaporated before being used. There are two basic types of evaporators. The principal difference is in the method of heating the liquid chlorine. One employs low pressure steam with a steam trap for collecting condensate and a pop valve set for as low as 5 lb. This type unit is rated at 2000 lb. per hr. The other type uses circulating hot water with heat applied by 120 lb. steam (through ejectors). The rating of this unit is 500 lb. per hr. per coil. As many as three coils (or even more) may be grouped in one bath.

Normally, the pressure of the gaseous chlorine from the evaporator is carried higher than is necessary for the process. This is desirable as it gives the operator a margin of safety in the event of pressure failure for some reason. It is necessary to reduce the chlorine line pressure to a constant before injecting into the bleaching system. This may be accomplished with any one of several pressure reducers specifically designed to withstand chlorine. One objection to this style of reducer is that the small ports in these units tend to plug up and stop their function.

Another method used to reduce chlorine pressure is to attach a pressure control unit to a bellows-sealed chlorine valve. A two point pressure recorder gives a check on the units action. An installation of this type is reducing the line pressure from 100 psig. pressure to 65 psig. pressure through a ¾-in. chlorine valve. The total chlorine passing through 1-in. piping and reduced by the above valve is about 2000 lb. per hr.

Piping, valves, packing

For many years the industry has been faced with a difficult problem of packing chlorine valves to hold gas and be of free movement. At present there are two good methods available. One is a bellows-sealed valve. The bellows can be made of monel or stainless steel. These valves are rather expensive but are satisfactory. The second method is the use of Teflon packing. This can be used in any one of several forms. Either a single piece cylinder the size of the stuffing box, a group of flat rings or the special shaped male and female rings may be used. Two valves in satisfactory service for 18 months are packed with two rings of Teflon and the balance of the stuffing box is filled with a monel ferrule.

The sizing of pipe and valves is quite important. One-inch extra heavy iron pipe has been found adequate to carry 2000 lb. per hr. One system is known to use a 1-in. header distributing chlorine to four different rotameters. The pressure on this header is 65 psig. with a drop of 25 psig. through the system. One half-inch piping and valves will handle up to 420 lb. per hr. Three quarter-inch piping and valves will take care of at least 600 lb. per hr. Since chlorine valves are rather special and generally expensive it is an economic factor worth considering to watch valve and pipe size closely.

While wrought iron works well with dry chlorine either liquid or gaseous, it will last only a few minutes in the presence of water and chlorine. For this reason it is necessary to use Hastelloy "C" pipe and valves where chlorine and water are intermixed as when feeding chlorine into a pulp slurry. Once chlorine is in water solution hard rubber lined equipment is satisfactory.

A problem often encountered in pulp bleaching is the proper and safe way to close a chlorine valve if the flow of stock is interrupted. If the cause of interruption is due to power failure the matter is quite simple. A solenoid valve energized from the motor terminals for the stock pump may be installed on the air supply line to the head of an air-operated chlorine valve. Thus in the event of power failure or air failure the chlorine valve will close until such time as the pump is started again. A switch in this circuit allows this valve to be opened or closed at will, thus giving complete control of chlorine flow.

Chlorine is a dangerous and active chemical. However, a full awareness of its dangers, its powers and its accomplishments make it a respected ally of the pulp and paper industry.

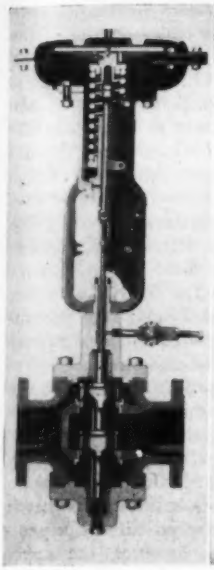

Fig. 1—High lift diaphragm valve

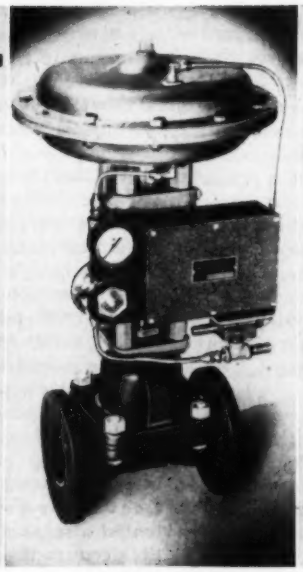

Fig. 2—Springless motor operator on Saunders patent valve

Fig. 3—Linear plugs

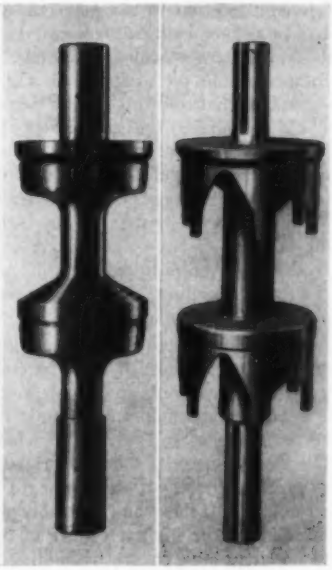

Fig. 4—Equal percentage plugs

How to select control valves

A trend toward automatic control of pulp and paper processes has become more and more evident in the new mills built and old ones modernized. Since the control valves are an integral part of every control system, paper mill engineers will want to review the factors and characteristics involved in their selection.

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Despite the wide application in industry of the many types of control valves, little information has been made available which would assist users in determining the correct valve to select for a specific installation. To properly apply a control valve it is necessary to recognize its capabilities and limitations —to know what it can do and how.

A control valve may be described as a variable resistance in a fluid flow system. In any automatic control installation, it is as important a component of the system as is the control instrument. It must be capable of performing in accordance with the dictates of the controller, otherwise the installation will be unsatisfactory.

Popular types of control valves are pneumatic, hydraulic, electric or manually operated—that is, their motive power is supplied by one of these four forms of operating energy. Since the pneumatic or diaphragm motor operated valves are much more widely employed than other types, this article is limited to design and construction, features which should be considered in selecting the diaphragm motor control valve.

Power unit

Basically, the valve assembly comprises a power unit or diaphragm motor and the control valve body. Two types of pneumatic operated power units are commonly employed, namely the spring opposed and the springless diaphragm motor.

Spring Opposed Diaphragm Motor—This power unit (illustrated in Fig. 1) has a flexible diaphragm with a pressure-tight chamber on the upper side; to this, the air output of the controller is connected. A compression spring assembly is coiled on the under side of the diaphragm. A stem connects the diaphragm plate to the valve disc. Air pressure applied to the top of the diaphragm creates a force equal to the product of air pressure multiplied by the area of the diaphragm. As the diaphragm moves downward, the spring compresses and creates an opposing force which, when equal to the downward force results in a balanced position of the diaphragm and consequently the valve disc.

In the design of the diaphragm motor certain fundamental principles must be followed. As the spring opposes the air loading pressure, it is desirable that a uniform increment of valve travel or lift be obtained from the energy expended. In other words, the ideal curve when plotting air pressure on the diaphragm member versus inner valve movement is a straight line. This characteristic is essential to satisfactory control, to cause uniform variance of inner valve position with changing loading pressures. The design characteristics also should be such that a minimum of friction is introduced.

Closely allied to friction is the char-

acteristic referred to as hysteresis. This may be defined as the difference between the valve stem position, resulting from an increase in air pressure to a given value, and that resulting from a decrease in air pressure to the same value. It is plotted over the entire range of air pressure and stem travel as two curves which form a closed loop. Excessive friction produces a wide hysteresis loop due to the inability of the control valve to reproduce a given position when the same pneumatic loading pressure is reproduced on the diaphragm.

There are numerous details of design and construction which must be closely watched if hysteresis in a control valve is to be kept at a minimum. Springs must be well made and carefully selected. Diaphragm material should be as flexible as possible consistent with strength and durability. Machine and assembly work must be of the highest caliber in order to eliminate any chance of binding and sticking outside of the stuffing box.

In an automatic control system the phenomenon of cycling or hunting may be a manifestation of a wide hysteresis loop. For example, if the area of the diaphragm is 100 sq. in. and the applied air pressure is seven psi., a total force of 700 lb. acts downward on the valve stem. This force compresses the spring until equilibrium is reached by an equal and opposite reaction and the inner valve comes to rest. Now assume that the instrument calls for a new valve position, which position would be obtained by an air pressure 7¼ psi. This extra ¼ psi. gives an additional total applied force of 25 lb. on the diaphragm. It is conceivable that a 25 lb. opposing force exists in the form of friction in the stuffing box and valve superstructure. In such a case, the valve fails to reach the position called for by the instrument, and the controlled variable continues to rise until the instrument raises the air pressure high enough so that the total applied force on the diaphragm overcomes the frictional force. This, of course, causes the valve to jump to a new position which is beyond that required for control, and the result is cycling or hunting.

Springless Diaphragm Motor—In the spring opposed diaphragm motor, just described, the spring is required to coordinate the valve position with the instrument air pressure, but while functioning it absorbs the power provided by the diaphragm motor and leaves little power available to overcome the unbalance in the valve. In certain types, such as Saunders Patent single-seated and butterfly valves, a high differential pressure across the valve results in a large stem thrust or unbalance. This must be overcome by the diaphragm motor. There is available for this application a springless diaphragm motor (Fig. 2) whose power is a direct function of effective air pressure and diaphragm area.

The power-absorbing spring is eliminated in this motor, and the underside of the diaphragm is loaded pneumatically with a constant air pressure which can be adjusted to suit conditions. The top is loaded automatically, through a force balance type of valve positioner, to any pressure required to hold the position dictated by the control instrument. The loading on one side or the other (depending on the direction of the thrust) can be set at a minimum, thereby making maximum differential pressure available, across the diaphragm, for overcoming thrusts. For example, if the pressure on the underside of the diaphragm is set at 15 psi., with a 30 psi. supply to the positioner, there is available a differential pressure of 15 psi. Wth an 80-sq. in. diaphragm, this amounts to 1200 pounds loading.

Body member

The most common type of valve body used for control purposes is the globe type comprisng: (1) a stuffing box; (2) inner port, and (3) an inner valve.

Stuffing Box—The stuffing box functions to seal the fluid flowing through the valve body, while permitting the valve stem to pass through as freely as possible. A nut is provided at the top of a sealing gland permitting access to the stuffing box chamber and providing a means of tightening the seal by compression on the packing material. Since this chamber can be the most serious cause of friction on the valve stem, the packing and lubricant for most fluids should provide an adequate seal with hand tightening of the gland nut. To further promote free action, the stem is highly polished. Good engineering practice today accepts packing depth to be six times the diameter of the stem member, with careful construction given to alignments and clearance of glands and other component stuffing box parts.

Temperatures of fluids above 450F cause excessive drying of the lubricant. For such applications, radiating fins are used to dissipate the heat before it reaches the stuffing box. Similarly, when fluid temperatures are below 32F, an extension column should be used to separate the stuffing box from the valve body. This prevents stuffing box lubricants from becoming too viscous and also prevents frosting of the valve stem.

Single vs. Double Port—Valve bodies are available in single- or double-port construction. The inner port is described as the opening within the valve body into which the valve plug seats to throttle the flow.

In single-port valves differential pressure acts over the entire bottom of the valve plug to create a vertical force on the valve stem. When the valve plug is in the closed position, moreover, the downstream pressure in many applications drops practically to zero. This increases the pressure differential across the valve so that the vertical thrust may constitute an appreciable force. The power unit must overcome this force in order to hold a direct acting (air-to-close) valve closed or to open a reverse acting (air-to-open) valve. For proportional control, the effect of the stem thrust is obviously undesirable.

The double-port body was designed to minimize the undesirable effects of this thrust. The inlet and outlet fluid pressures tend to balance themselves by acting both upward and downward on the two valve discs, resulting in what is termed a semi-balanced valve. For practical construction, however, the upper port is usually made slightly larger than the lower so that the lower valve disc may pass through the upper port when the inner valve is installed. The double-port construction has one disadvantage. With variation in temperature, the stem portion connecting the two valve plugs contracts or expands linearly a different amount than the valve body. In the closed position, therefore, one valve disc seats first and prevents the second disc from seating completely. This results in a minimum or "leakage" flow. Thus, when the tight shut off is required, a single port valve must be used.

Inner valves

The most important factor in the overall performance of the control valve is the flow characteristic which, in effect, describes the manner in which the control valve acts. The term inherent valve characteristic is used to denote the relation between stem position and flow under constant pressure drop. When the drop or pressure differential does not remain constant, as usually occurs in service, the characteristic curve is manifestly modified to provide what is termed the effective valve characteristic.

A complete discussion of valve characteristics is beyond the scope of this discussion, which is limited to a description of the more common types of plugs used with control valves plus inherent characteristics.

There are three common types of inner valves: (1) quick opening; (2) linear, and (3) equal percentage.

Quick Opening—This is a bevel-seated or poppet-type inner valve in which the area of the opening is determined by the perimeter of the disc times its valve lift. There are no restrictions after the inner valve leaves the seat, and the valve reaches maximum capacity at a rela-

tively small proportion of lift. This type of valve is generally used for open and shut service.

There are numerous applications where process characteristics are such that adequate control cannot be obtained by a two-position valve of this type. Rather, the control element must possess a throttling characteristic or an ability to assume intermediate positions in its full travel, as dictated by the control instrument. This throttling valve must possess a higher lift than the on-off valve, since the higher the lift, the simpler it becomes to obtain a characteristic. These so called high-lift valves are generally furnished with either of two types of inner valves: (1) linear, and (2) equal percentage.

Linear Plug—This inner valve is supplied either as a V-port disc or as a solid plug (Fig. 3). The choice of either V-port or solid plug in clean service is largely a matter of user preference. The solid plug is a better selection when there is a possibilty of plugging or erosion due to the presence of suspended solids in the fluid. The flow-lift plot for this plug is a straight line on rectilinear coordinates, giving equal volume changes for equal stem changes, regardless of per cent of valve opening (Fig. 5). This

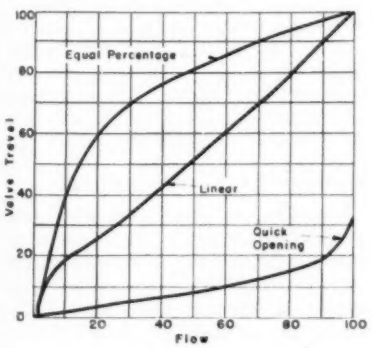

Fig. 5—Flow-lift characteristic curves

type of characteristic is needed where pressure drop in the system is largely concentrated in the control valve and most of the energy must be dissipated by it.

Equal Percentage Plug—As with the linear inner valve, the equal percentage disc may be either V-ported or solid (Fig. 4). The flow lift curve at constant pressure drop is a straight line on semi-logarithmic paper. A control valve with this characteristic will produce a constant rate of change in flow per unit change in lift at constant pressure drop (Fig. 5). This change is always an equal percentage greater or smaller than the flow that existed at the moment preceding the increase or decrease in lift.

In general, the equal percentage inner valve can be used to advantage:

A. Where only a small percentage of the total system pressure drop is available across the valve.

B. When a control valve is in series with pumps, heat exchangers and other resistances. Here pressure drop across the valve is likely to be low at high rate of flow but high at low flow. Even with variable flow and pressure drop, the equal percentage characteristic provides uniformly satisfactory control at any point of lift in excess of clearance leakage.

C. When operating conditions cannot be determined and it is necessary to install a line-size valve. It is rather difficult to oversize a valve with an equal percentage characteristic, which basically has the following capacities:

Per Cent of Total Valve Lift	Per Cent Total Flow at Constant Differential Pressure
25	7— 8
50	12.5— 15
75	37— 40
100	100

It is evident that the greatest percentage of flow is passed during the last portion of the lift. Note that at 50 per cent opening the equal percentage inner valve gives about 13-15 per cent capacity. The linear type on the other hand gives about 50 per cent capacity of 50 per cent lift.

Materials of construction

The design and construction features that are important for proper valve functioning have been discussed. The next factor to be considered is what type of body and trim materials must be used or can be used to handle the flow in question. For those unfamiliar with the term, trim applies to the lower stem, inner valve, seat rings and stuffing box parts.

Common body materials in use today and their specific application are as follows:

Iron—Up to 250 psi. and 250F, where corrosion conditions permit the use of iron.

Cast steel—For use where pressures may be as high as 6000 psi. and where temperatures do not exceed 600F. Again corrosion conditions must permit the use of this material.

Bronze—Pressures to 300 psi. and temperatures not exceeding 350F, corrosion conditions permitting.

Special Alloys—Bodies may be made in special alloys, such as acid-resisting bronze, Hastelloys and 18-8 stainless steel.

The following are some of the more commonly used trim materials.

Bronze—For low pressure drop across the valve. Generally not recommended over 35 pounds pressure drop.

Stainless Steel—Suitable for elevated temperatures and for resisting erosion and wiring drawing. The most widely used stainless is 316 and 18-8 steel with 1.75-2.5 per cent molybdenum.

Special Alloys—Special alloys such as Hastelloys, monel, red brass, nickel, etc., are available. Hardened stainless steel (450-500 Brinnel) and Stellite facing on contoured plugs are used to minimize wire drawing and galling.

Effect of valve size

Even the most carefully designed diaphragm motor valve will not function at its best if improperly sized. Oversize valves wear out rapidly. A valve which is working too close to its seat tends to wire draw across the seating surface, resulting in early unserviceability. Valves should be selected from any manufacturer's capacity tables or charts; these exist in various forms.

For example, in the C_v method of valve sizing, the existing conditions (pressure drop, specific gravity, etc.) of the fluid flowing through the control valve are first converted in a reference condition. This is the quantity (gpm) of water at 60F that will flow through the valve with a pressure drop of one psi., and is called the flow coefficient (C_v). After the existing conditions have been converted into the flow coefficient, the valve size is found by referring to a table which shows valve sizes corresponding to the C_v. There are three formulae for converting the given flow conditons into C_v.

For Liquids: $C_v = Q\sqrt{G}/\sqrt{h}$
where Q = quantity in qpm; G = specific gravity (water = 1), and h = pressure drop in psi.

For Gases: $C_v = Q\sqrt{G(460 + t)}/1360\sqrt{hp}$
where Q = quantity of CFH at standard conditions of 60F and 14.7 psi. absolute; t = temperature in degrees F; h = pressure drop in psi., and p = upstream pressure in psi. absolute.

For Steam: $C_v = Q\sqrt{V}/63.5\sqrt{h}$
where Q = quantity in pounds per hour; V = specific volume in cubic feet per pound at the existing upstream pressure (psia) and the existing steam temperature in degrees F, and h = pressure drop in psi.

In the formulas for gases and steam, when the existing pressure drop (h) is greater than 50 per cent of the absolute upstream pressure, disregard the given pressure drop and use one-half the absolute upstream pressure for (h).

Standards and control reports in paper manufacture

G. R. CASE
C.P.A., Pomona, Cal.

IMPROVEMENTS THROUGH COST REDUCTIONS and better sales realization resulted from the application of a standard cost system in a firm manufacturing paper. Perhaps the outstanding feature of the system is its tailor-made character, in accordance with which standards have been established to disclose variances aligned with critical cost areas in the papermaking process. These variances, as well as other operating data, are brought to the attention of management in both daily and monthly reports.

The present study results from an engagement to make an analysis of accounting methods and cost controls in effect in the company in question, with a view to providing the tools for management to do a better job in reducing costs and improving the profit picture. In reporting on the problems involved and the steps taken in this assignment, it is not proposed to go into all of the mechanics of the systems which eventuated but rather to give a general picture of the nature of the problem, the conditions found, the development of standards and variances, the method of reporting adopted, and results obtained.

The company has a capacity to produce annually 25,000 tons of tissue grades of paper varying in basis weight from 10 pounds to 25 pounds. Pulp is purchased and processed through one high speed modern paper machine and two old machines. About one-half of the production is sold in jumbo rolls and the remainder is converted into finished paper products.

The old and the new

In the course of the review of the existing controls, it was found that rather extensive measurements were made of operating efficiencies in terms of percentages of utilization of materials and time. Costs and expenses were broken down in considerable detail, departmentally and functionally. Individual run costs were maintained. Sales prices were determined, where possible on cost estimates, utilizing run costs. The figures thus made available enabled management to put its finger on certain weaknesses and they also informed operating supervision of trends in certain operations. However, the data, whatever their helpful effects, appeared to be without results in reducing the cost of operations as a whole, which was the need faced by the company.

It may be acknowledged that measurements of efficiency for cost control purposes can frequently be effective if expressed in percentages, machine hours, etc. However, this is not always the case. In this instance it appeared that only dollar amounts—rather than ratios, quantities or operation volumes—could adequately reflect the relative importance of many variable factors in paper manufacturing. It was apparent also that the extensive breakdown of costs and expense was not as important, in controlling costs, as knowing what the cost of the product should be, what it actually was, and the reasons for the difference. These conclusions suggested simplification of the cost breakdown, determination of the important variable cost factors, and establishment of a standard cost plan that would disclose results of operations in a significant way.

The chart of accounts was condensed to feature only important elements of cost and expense and then expanded so far as necessary to facilitate the segregation of variable and fixed costs, departmentalized only to the extent needed for costing purposes and the application of budgets. A broad segregation was made between material costs and machine operating costs. Breakdowns of these costs were made by grades and kinds of materials used and by the major elements of operating costs by machines. (It should be pointed out that the only variance taken into the books is purchase variance. Standard costs and the remaining variances are shown on the reports only.)

The variable factors, such as weight of paper, scrap, machine speeds, etc., involved in the manufacture of paper were then thoroughly discussed with the various department heads and management and the important variances, which it was desired to reflect in reports, were decided upon.

The major classifications of costs and variances selected are listed below:

MATERIAL COSTS

Cost Classifications

Pulp:
- Bleached sulphite.
- Bleached sulphate.
- Unbleached sulphite.
- Natural kraft.

Secondary furnish: (Waste paper)
- Bleached.
- Unbleached.
- Groundwood.
- Kraft.

Dyes and chemicals.
Cores and other direct materials.

Variances to be Developed

1. Purchase variance.
2. Material specification (mix of grades of pulp and secondary furnish).
3. Production of broke (scrap paper).
4. Sewer loss (fibre lost in operations).
5. Weight of paper produced.
6. Unaccounted for.

MACHINE COSTS

Cost Classifications

Labor and payroll costs.
Power.
Fuel.
Felts and wires.
Other indirect materials and supplies.

Variances to be Developed

1. Speed.
2. Production at speed.
3. Downtime.
4. Cost per producing hour.

A committee to set standards

The next step was the establishment of standards which would permit the setting forth of the desired classifications of variances. This responsibility was given to a standards committee consisting of the mill superintendent, technical director (laboratory and research supervisor) and the sales manager. Costs, speeds, production, downtime, etc., actually experienced over the last few years and most recent months were studied. Industry figures showing average labor cost per ton, etc., were reviewed. (These proved to be of little use in setting standards, since the figures included plants making all grades and weights of paper.) No other outside data could be found that would be useful. Also, it was felt that time study men would have been of little use on this type of operation. The plant's own figures, therefore, constituted the primary basis for the establishment of the standards.

Material cost standards

It is possible to describe briefly the bases used for setting the six material-related standards necessary for the dis-

Mr. Case's article first appeared in the July 1951 N.A.C.A. Bulletin, published by the National Association of Cost Accountants, New York, N.Y.

closure of the types of variances already mentioned. The first of these calls for price stands. Since prices for pulp and secondary furnish (waste paper) are usually fairly stable for quarterly periods, it was decided that the standard values for these materials would be established at the prices in effect for each grade at the beginning of each quarter, and the difference between these standards and the actual price paid would be put in the purchase variance account.

The mix of materials standard is next in order. Material specification standards were set up on the basis of specifiications of various grades of pulp and secondary furnish for each grade and kind of paper produced, as agreed to by all members of the committee. They took into consideration, primarily, specifications previously established by the laboratory. Changes were made only where it was felt that less costly grades of furnish could be used satisfactorily. These standards for the various grades of materials required were set in percentages of the total of materials for each grade, so that they could be applied to tons of pulp and secondary used.

The third standard set concerns material loss in processing. The control of broke is important and careful consideration was given to the allowances which should be made for broke on each machine. Consideration was given to the average number of mill runs and the nature of order changes which had occurred over the previous several months. The standard percentage was set somewhat below past experience but at a figure which was considered attainable.

Further material loss, in the form of so-called sewer loss, is an unavoidable element of paper manufacture. This calls for standards related to the fourth material variance listed. A certain amount of pulp fibre cannot be saved regardless of the recovery equipment used. The loss is increased by the necessity of washing out the equipment between runs and the bleeding of the equipment occasionally in order to maintain paper strength. After a study of these factors on past performance, a percentage allowance for each machine was established here also, based primarily on past experience.

Standards for the weight of paper produced and provision for material losses not determinable complete the material cost standards. The standards required for determining weight variance had already been established by the sales and the production departments. The "unaccounted for" loss is quite another matter.

Not all pulp fibre can be accounted for. There is a loss which cannot be measured in operations. In addition, measurements of basis weights are not accurate due to the small percentage of the paper that can be tested and varia-

Table 1

DAILY STATEMENT OF MILL PRODUCTION

FOR OPERATIONS OF November 17, 1950

MACHINE TENDER TOUR FOREMAN	MILL ORDER NUMBER	PRODUCT	NUMBER OF BREAKS	WINDER TRIM	ACTUAL AVERAGE TOTAL BASIS WEIGHT	AVERAGE SPEED ACTUAL	AVERAGE SPEED STD	PRODUCING HOURS	PRODUCING TONNAGE PER HOUR	PRODUCTION POSSIBLE AT SPEED & TRIM	ACTUAL GOOD PRODUCTION TONNAGE	LOSS TONNAGE
Jones Williams	N154	Vasing, #1 16 Dry	1	122	16.15	690	680	7.7	2265	17,440	16,500	940
Jones	N154	Same	2	122	16.05	680	680	1.0	2219	2,219	2,000	219
Same	52103	Garment Cover #1 18 Dry	0	120	17.96	580	560	6.8	2083	14,164	13,580	584
Clark Gift	52103	Same	1	120	18.03	590	560	8.0	2128	17,024	15,770	1254
						624	604	23.5	2[illegible]	50,847	47,850	2997

TOTAL FURNISHED		TOTAL TONS PRODUCED	
SPEC PER BATCH	ACTUAL TONS	4 D	SCALE
5 Bales #1 Sulphite	18.3	24.9	23.9
5 " #1 Sulphite	5.1		
200# #1 Secondary	1.0		
Slush Adj.	- .3		
	23.1		

PRODUCTION DATA	STANDARD PRODUCTION			47949
PRODUCING HOURS	ACTUAL	STANDARD	VARIANCE	VARIANCE MONTH TO DATE
SPEED HOURS	23.5	23.3	.8	22.1
PRODUCTION HOURS	23.5	24.3	(0.8)	(16.6)
TOTAL PRODUCTION HOURS	23.5	23.6	-	5.5
COST				
SPEED	587.50	605.00	19.00	552.50
PRODUCTION	567.50	567.50	(20.00)	(415.00)
TOTAL	587.50	585.00	(1.00)	137.50

All Figures Hypothetical

REASONS FOR DOWN TIME

Adjust Calender Stack Clutch	0.3
Change Orders	0.2

	FREE MONTH	1	YEAR TO DATE	15
DOWN TIME DATA	OPERATING HOURS			24
	ACTUAL		ALLOWED	
	Hours	Amount	Hours	Amount
TODAY	0.5	10.00	1.5	30.00
YEAR TO DATE	318.6	6372.00	369.2	6986.00

VARIANCE: TODAY 20.00; YEAR TO DATE 612.00

Table 2

Monthly Statement of Manufacturing Variances

Paper Making - All Machines
Month of October and Year to Date 1950 - 10 Months

Reasons for variance	Month of October Amount	Month of October % to total standard	Year-to-Date Amount	Year-to-Date - 10 Months % to total standard
Material Variance				
Basis weight	(1,000.00)	(.3)	(26,000.00)	(1.0)
Sewer loss	(300.00)	(.1)	(8,500.00)	(.3)
Production of co. broke	(1,200.00)	(.3)	(72,000.00)	(2.8)
Fibre specification	(100.00)	.1	8,000.00	.3
Inventory adjustment	(200.00)	(.1)	500.00	
Unaccounted for	(400.00)	(.1)		
Total	(3,000.00)	(.8)	(98,000.00)	(3.8)
Scale tons produced	2,000.0		20,310.6	
Cost per ton - Standard	150.00		125.40	
Actual	151.50		130.23	
Variance	(1.50)		(4.83)	
Machine cost variance				
Speed	100.00	.1	(2,000.00)	(.1)
Production	(900.00)	(.3)	(19,000.00)	(.6)
Downtime	(300.00)	(.1)	(3,000.00)	(.1)
Cost per producing hour	(400.00)	(.1)	(9,000.00)	(.3)
Total	(1,500.00)	(.4)	(33,000.00)	(1.1)
Cost per ton - Standard	32.50		25.94	
Actual	33.25		27.57	
Variance	(.75)		(1.63)	
Total cost				
Cost per ton - Standard	182.50		151.34	
Actual	184.75		157.80	
Variance	(2.25)		(6.46)	

Cost per producing hour variance by elements

	MONTH OF OCTOBER Amount*	MONTH OF OCTOBER % to total standard	YEAR-TO-DATE - 10 MONTHS Amount*	YEAR-TO-DATE - 10 MONTHS % to total standard
Labor and payroll expense	(675.00)	(.2)	(8,000.00)	(2.6)
Power	150.00	.1	(2,500.00)	(.8)
Fuel	(100.00)		1,000.00	.3
Felts and wires	(200.00)	(.1)	(3,000.00)	(1.0)
Other indirect materials and supplies	125.00		500.00	.2
Total	(700.00)	(.2)	(12,000.00)	(3.9)

* Includes downtime variance

All figures hypothetical

tions in moisture content. Then there are the errors which can occur in reported production and in physical inventories. In order to take care of these items, a variance classification must be established. This variance is the difference between identified variances in total and the total variance in material usage as determined by total production costed at standard as compared with actual cost.

This residual variance is designated as "unaccounted for." It is one of the main reasons for developing only standards which will permit the presentation of the major variances in operations. It is also a reason why the calculation of the specific variances must be done with extreme care, since any errors in these calculations would not be readily discovered as they would be off-set in the unaccounted for variance. Experience has shown that the unaccounted for variance is minor in amount as compared with the variances which are identified.

Material cost variances

After the establishment of the standards, it proved a relatively easy matter to work the variances. For example, the material specification variance represents the difference between the standard cost of formula materials and the standard cost of the materials actually used. The total tonnage to which the percentages of materials specified (the terms in which the standards are set) are applied is the total actual pulp and secondary furnish used for the production of paper of each weight and grade. The difference between the quantities of material thus determined priced at standard and the quantities actually used priced at standard gives the specification variance in dollars.

The production of broke beyond a reasonable amount is costly both from the standpoint of lost machine time and the reduction in value of the material, since broke is of no more value than waste paper which can be purchased normally at considerably less than virgin pulp. Since material variances only are being considered here, the reduction in value of material involved in the broke in excess of the allowance is the measure of broke variance. In order to show this variance separately, it is detached from the specification variance as calculated above, since any additional pulp used as a result of the production of excess broke would automatically be included in the specification variance. The wasted machine time variance will be covered later in connection with machine cost variances.

Since the sewer loss is measured in pounds of fibre lost, the sewer loss variance is the difference between the allowed percentage of loss and the actual percentage of loss multiplied by the standard cost of material actually used.

It is a matter of opinion whether any variance should be shown for the difference between the standard basis weight and the actual basis weight of the paper produced, since part of the paper is sold by weight in jumbo rolls and the company thus does not sustain a loss on such sales of overweight paper. However, although paper is ordered for the converting department or converting customers by weight, the converted products are sold in sheets or in bundles. Overweight paper represents a loss to the converting department or to the converting customers to the extent of the overweight.

Since it is frequently easier to run the paper overweight, especially in lighter grades, it is necessary to keep weights under control constantly. It was decided, therefore, that the paper mill should be penalized for running overweight. Consequently, a variance is shown which consists of the percentage of overweight multiplied by the total standard cost of material. Overweights on jumbo rolls ordered by the sales department are reflected in cost of sales as a gain to offset that part of the basis weight variance which does not represent a dollar loss to the company.

Machine cost standards

The variance types applicable to machine costs, with respect to which it was decided to develop data, have been given earlier in this paper as four in number. The first requires speed standards. Records covering attained speeds for each grade and weight of paper on each machine were reviewed and standard speeds were set (in most cases) at the highest attained speed, which was considerably above average. Since it was planned to use these speeds to measure daily performance, it was necessary to make allowances for break-in periods for new felts. An average number of hours was set for the normal break-in period for felts on each machine. During these periods no variance is shown for the difference between standard and actual speed. Although it has not been tried in this mill, it might be better to set lower speed standards for these periods.

The standard for the second or "production at speed" variance was set at the percentage allowance made for broke. This was in line with the facts, inasmuch as machine time used in producing broke in excess of the allowed time, is considered wasted.

With respect to downtime standards, the detailed records of downtime for changing felts and wires, for machine wash-up between runs, etc., were reviewed and an average downtime allowance was set for each machine in hours per day at normal capacity. These allowances were set at less than actual experience, since the committee members were sure that downtime could be reduced. Standard costs per hour of downtime were also established for each machine and by causes of downtime (such as felt and wire changes, wash-ups, etc.) requiring different sized crews.

The final standard set was for cost per producing hour. In considering the establishment of standards for machine cost, the standards committee reviewed the variable costs on each machine for the previous several months and set at cost per producing hour for each machine which was considered attainable. These standard costs were broken down by the elements of machine cost i.e., labor, power, etc., as previously listed.

Machine cost variances

The calculation of dollar variances on machine operation probably needs little explanation, since the variances may be similar to those developed in respect of large machines in many industries. Speed variances are measured first in feet per minute and then converted to hours of machine time lost or gained and finally to dollars at standard cost per producing hour. Production at speed variance is measured in tons of production lost as compared with the standard allowed loss and the difference converted to machine time lost or gained at standard cost per producing hour. A short-cut to these answers, which is used in this case, is to multiply the actual producing hours on each machine by the standard cost per producing hour and to multiply this total by the percentage of variance in speed to obtain speed variance and by the percentage of the gain or loss in production to total standard production, to obtain production variance.

The cost per producing hour variance is the difference between actual operating cost and the producing hours multiplied by the standard cost per producing hour. Downtime is actually a part of this variance, since all costs are related in the final analysis to speed and production. The difference between that part of the cost per producing hour allotted to downtime and the actual downtime cost, which is accumulated separately in the accounts, is the downtime variance. The remainder of the actual cost is measured against the standard, both actual and standard being broken down to show variances for labor, power, fuel, etc.

Better cost control reflected in diminishing variances

The standards established in the manner described were used for about three months without change and then revisions were made in those which were obviously out of line with possible attainment. The revised standards have now been in use for about a year without further change except to reflect changes in prices of material and in hourly labor rates and improvements in

Table 3

MONTHLY STATEMENT OF OPERATIONS

Month of October and Year-to-Date 1950 – 10 Months

	Month of October			Year-to-Date – 10 Months		
ROLLS	Standard or Budget	Actual	Variance	Standard or Budget	Actual	Variance
Net sales	$300,000.00	$300,000.00	—	$2,700,000.00	$2,700,000.00	—
Variable cost of sales	225,000.00	228,000.00	$(3,000.00)	1,998,000.00	2,106,000.00	$(108,000.00)
Variable profit	$ 75,000.00	$ 72,000.00	$(3,000.00)	$ 702,000.00	$ 594,000.00	$(108,000.00)
Per cent of net sales	25.0%	24.0%	(1.0%)	26.0%	22.0%	(4.0%)
CONVERTED PRODUCTS						
Net sales	$200,000.00	$200,000.00	—	$1,750,000.00	$1,750,000.00	—
Variable cost of sales	140,000.00	142,000.00	$(2,000.00)	1,216,250.00	1,251,250.00	$(35,000.00)
Variable profit	$ 60,000.00	$ 58,000.00	$(2,000.00)	$ 533,750.00	$ 498,750.00	$(35,000.00)
Per cent of net sales	30.0%	29.0%	(1.0%)	30.5%	28.5%	(2.0%)
ALL PRODUCTS						
Net sales	$500,000.00	$500,000.00	—	$4,450,000.00	$4,450,000.00	—
Variable cost of sales	360,000.00	365,000.00	$(5,000.00)	3,174,250.00	3,317,250.00	$(143,000.00)
Variable gross profit	$140,000.00	$135,000.00	$(5,000.00)	$1,275,750.00	$1,132,750.00	$(143,000.00)
Other variable (Bad debts)	5,000.00	5,000.00	—	40,000.00	40,000.00	—
Variable profit	$135,000.00	$130,000.00	$(5,000.00)	$1,235,750.00	$1,092,750.00	$(143,000.00)
Per cent of net sales	27.0%	26.0%	(1.0%)	27.8%	24.5%	(3.3%)
FIXED EXPENSES						
Manufacturing						
Plant supervision and indirect labor	$ 16,000.00	$ 17,200.00	$ 800.00	$ 170,000.00	$ 174,000.00	$ (4,000.00)
Payroll expense	1,800.00	1,720.00	80.00	17,000.00	17,500.00	(500.00)
Maintenance materials	5,000.00	5,200.00	(200.00)	45,000.00	45,900.00	(900.00)
Miscellaneous manufacturing expense	1,200.00	1,080.00	120.00	12,500.00	12,400.00	100.00
Total	$ 26,000.00	$ 25,200.00	$ 800.00	$ 244,500.00	$ 249,800.00	$ (5,300.00)
(Increase) or decrease in fixed expenses in inventory	$ (1,000.00	$ (1,000.00)	—	$ 5,000.00	$ 5,000.00	—
Administrative, sales and shipping	20,000.00	20,400.00	$ (400.00)	181,500.00	184,200.00	$ (2,700.00)
Taxes	6,000.00	5,500.00	500.00	60,000.00	60,200.00	(200.00)
Insurance	1,000.00	1,100.00	(100.00)	10,500.00	10,400.00	100.00
Depreciation	16,000.00	16,000.00	—	160,000.00	160,500.00	(500.00)
Total fixed operating expenses	$ 68,000.00	$ 67,200.00	$ 800.00	$ 661,500.00	$ 670,100.00	$ (8,600.00)
Interest and other expense and income (Net)	$ 2,000.00	$ 1,800.00	$ 200.00	$ 22,000.00	$ 23,000.00	$ (1,000.00)
Total fixed expenses	$ 70,000.00	$ 69,000.00	$ 1,000.00	$ 683,500.00	$ 693,100.00	$ (9,600.00)
Net profit at current cost before tax	$ 65,000.00	$ 61,000.00	$(4,000.00)	$ 552,250.00	$ 399,650.00	$(152,600.00)
Realized gain on pulp inventory	8,000.00	8,000.00	—	40,000.00	40,000.00	—
Net profit before tax	$ 73,000.00	$ 69,000.00	$(4,000.00)	$ 592,250.00	$ 439,650.00	$(152,600.00)
Federal income tax	30,660.00	28,980.00	1,680.00	243,925.00	179,833.00	64,092.00
Net profit after tax	$ 42,340.00	$ 40,020.00	$(2,320.00)	$ 348,325.00	$ 259,817.00	$ (88,508.00)
	8.5%	8.0%	(.5%)	7.8%	5.8%	(2.0%)

All figures hypothetical

Table 4

VARIABLE COST OF SALES

Month of October and Year-to-Date 1950 – 10 Months

	Month of October			Year-to-date – 10 Months		
ROLLS	Standard	Actual	Variance	Standard	Actual	Variance
Cost of manufacturing						
Direct materials						
Pulp and Broke	$290,000.00	$292,000.00	$(2,000.00)	$2,454,000.00	$2,540,000.00	$(86,000.00)
Other direct materials	10,000.00	11,000.00	(1,000.00)	93,000.00	105,000.00	(12,000.00)
Total	$300,000.00	$303,000.00	(3,000.00)	$2,547,000.00	$2,645,000.00	$(98,000.00)
Machine cost						
Labor and payroll expense	$ 30,000.00	$ 30,675.00	$ (675.00)	$ 222,000.00	$ 230,000.00	$ (8,000.00)
Power	15,300.00	15,150.00	150.00	135,500.00	138,000.00	(2,500.00)
Fuel	5,500.00	5,600.00	(100.00)	53,000.00	52,000.00	1,000.00
Felts and wires	12,000.00	12,200.00	(200.00)	112,000.00	115,000.00	(3,000.00)
Other indirect materials and supplies	3,000.00	2,875.00	125.00	25,500.00	25,000.00	500.00
Speed and production variance	(800.00)	—	(800.00)	(21,000.00)	—	(21,000.00)
Total	$ 65,000.00	$ 66,500.00	$(1,500.00)	$ 527,000.00	$ 560,000.00	$(33,000.00)
Total cost of manufacturing	$365,000.00	$369,500.00	$(4,500.00)	$3,074,000.00	$3,205,000.00	$(131,000.00)
(Increase) or decrease in inventory	(23,000.00)	(23,000.00)	—	(118,000.00	(118,000.00)	—
Cost of rolls used or sold	$342,000.00	$346,500.00	$(4,500.00)	$2,956,000.00	$3,087,000.00	$(131,000.00)
Less: Rolls used in converting	120,000.00	121,000.00	1,000.00	983,000.00	1,003,000.00	20,000.00
Balance	$222,000.00	$225,500.00	$(3,500.00)	$1,973,000.00	$2,084,000.00	$(111,000.00)
Provision for bad debts	3,000.00	3,000.00	—	25,000.00	25,000.00	—
Pulp and secondary purchase variance	—	(500.00)	500.00	—	(3,000.00	3,000.00
Total variable cost of sales	$225,000.00	$228,000.00	$(3,000.00)	$1,998,000.00	$2,106,000.00	$(108,000.00)
Tons sold		1,230.0			13,144.5	
Variable cost per ton of sales	$ 182.90	$ 185.30	$(2.40)	$ 152.00	$ 160.22	$ (8.22)
CONVERTED PRODUCTS						
Cost of manufacturing						
Rolls used	$119,800.00	$121,000.00	$(1,200.00)	$ 978,000.00	$1,003,000.00	$ (25,000.00)
Other direct materials	8,000.00	8,200.00	(200.00)	69,000.00	72,000.00	(3,000.00)
Direct labor and variable burden	16,000.00	16,600.00	(600.00)	153,000.00	160,000.00	(7,000.00)
Total cost of manufacturing	$143,800.00	$145,800.00	$(2,000.00)	$1,200,000.00	$1,235,000.00	$ (35,000.00)
(Increase) or decrease in inventory	(5,800.00)	(5,800.00)	—	1,250.00	1,250.00	—
Provision for bad debts	2,000.00	2,000.00	—	15,000.00	15,000.00	—
Total variable cost of sales	$140,000.00	$142,000.00	$(2,000.00)	$1,216,250.00	$1,251,250.00	$ (35,000.00)
Tons sold		700.0			7,142.3	
Variable cost per ton of sales	$ 200.00	$ 202.85	$ (2.85)	$ 170.29	$ 175.19	$ (4.90)

All figures hypothetical

equipment. At the beginning of this year-long period, actual costs ran about 9 per cent in excess of standard costs. Actual costs in the most recent operations for which results are available, are running about 1½ per cent in excess of standard costs. This would seem to illustrate that the improvement which can be made when management and operating supervision become conscious of the dollars being lost in each major variable factor in operations is a substantial one and that standard costs established on a purely practical basis may serve to attain the objective.

While it might appear that variances have not been broken down far enough, it is felt that better results have been accomplished (and faster) than if it had been attempted to reflect every possible variable factor in paper manufacture. When costs have been reduced to a point where it appears that no better operating results can be obtained from the present setup, it is planned to refine standards and variance reports to reflect some of the minor variances so that mill supervision may go to work on further cost reductions, consistent with the maintenance of quality standards.

Mill cost control reports

In order to produce the best results, it is necessary, not only to establish the standards and calculate the variances but, in addition, to properly present the information at a time when it will do the most good. Accordingly, a production report, illustrated in Table 1, is issued for each day for each machine showing for each shift the name of the machine tender and foreman, mill order number, product, standard basis weight, actual average basis weight, number of paper breaks, window trim, actual speed, standard speed, producing hours, pounds per hour, pounds of production possible at actual speed and trim, pounds of actual good production, and pounds lost. The total standard production for the day at standard speed is also shown, together with the machine hours and dollars of machine cost (at standard cost per producing hour) lost or gained due to speed and due to production of broke for the day and month-to-date.

The downtime in hours and downtime cost are compared with the allowed standard in hours and dollars, and the variance in dollars is shown for the day and year-to-date. It was found that downtime could be controlled more effectively by a year-to-date measurement than by monthly measurement, due to the length of time between wire and felt changes and other fluctuations in downtime.

A daily mill data sheet is also issued to management and mill supervision reflecting fuel used, boiler efficiency, peak power loads, water usage, and other practical statistics helpful to mill supervision in controlling physical operations. With this information, especially the dollar variances, in front of the operating personnel daily, they are stimulated to put forth constant effort to show the best possible results.

The monthly reports of variances issued to management and mill supervision show the dollar variances broken down, in line with descriptions given in the forepart of this article, to material and machine costs and summarized for all machines. These reports take the form shown in Table 2. The cost per producing hour variance is also shown functionally by labor, power, fuel, felts, and wires, etc. For each variance, the per cent to total standard cost of production for the month is shown. Total variance per ton is shown to permit an appraisal of the improvement in cost performance, regardless of volume of operations.

Product profitability and sales volume reports

To make sure of profitable operations, it is necessary to control both costs and sales realization. In this connection sales prices and volume in higher margin products are the most important considerations. In order to determine quickly the relative merits of the various sales from a profit producing standpoint, a statement is prepared each month reflecting gross sales (tons and dollars), net sales, variable cost, total cost (including fixed costs), variable and net profit per ton and variable profit per cent to net sales for each product, each major customer, and each geographical area.

Net sales are after deduction of freight, commissions, and discounts, so that net sales realization is on a uniform basis for all products, regardless of the method of selling and the destination. The costs shown are calculated at standard, which results in uniform costing for all products. The variable and net profits are reconciled in total at the end of the statement to actual variable and net profit before income tax to reveal the total variances due to production efficiency and due to volume.

By use of this statement, the volume of business in each variable profit margin class can be determined and decisions made therefrom to increase or decrease prices or to attempt to increase volume in the grades and types of products which contribute the higher margins or to increase sales in the most profitable areas, taking into consideration the competitive factors in each case. Since standard costs are changed as soon as general increases or decreases occur in raw material costs, this statement shows how effective the sales department has been in getting prices in line with cost changes as soon as they occur, in order to maintain the desired average variable profit per cent.

Historical quantity sales volume reports are kept up-to-date by quarterly periods. This has the effect of measuring the progress made in increasing the sales volume by products in line with policy established as a result of reviewing the monthly sales profitability analysis mentioned above. Customer volume records are also kept for reference.

Statement of operations

The monthly statement of operations, Table 3, is set up to show the variable profit realized on a current cost basis. It has been found that the form of presentation used is more easily understood and is of more value to management than the conventional form. Any gains or losses occasioned by using lower cost inventories in a rising market or higher cost inventories in a falling market, respectively, are shown separately in the statement. With this element so shown, it is possible to determine a variable profit on about the same basis as though the "lifo" method of handling inventories were used. The company uses the first-in-first-out method of inventory valuation, but it is not difficult to show the inventory profits or losses and to obtain the advantage of disclosing the results of operations on the basis of current costs and selling prices.

This is particularly important in a rapidly rising market when a large part of the profits may result from the use of lower cost inventories. The past year has been one of substantial and rapid increases in the prices of pulp and secondary materials. In the month of the first large increase in material cost, the company's variable profit percentage dropped about seven points on a current basis, whereas in the month of the second and larger increase in material costs, the decrease in the variable profit percentage was less than two points, indicating that sales prices were more quickly adjusted in the latter instance, probably largely as a result of setting forth the inventory profit separately in the first instance and so making the situation clear at once.

Also shown on the monthly operating statement are the standard and budgeted cost and expenses, so that the net profit which should have been made is compared with the actual net profit. Supplementary presentation of variable cost of sales breakdown is illustrated in Table 4. Fixed costs do not need separate presentation, since they are detailed below the variable profit in the operating statement. The amount of fixed manufacturing overhead included in the increase or decrease in inventories is shown below fixed costs in the operating statement.

Paper Mill Power—Part X

Conditioning raw water for boiler use

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HIGH PRESSURE BOILERS necessary for low-cost power generation demand a better quality of feedwater than that required by the lower pressure operation.

To keep down the cost of water treatment, the first rule is to conserve and return all possible clean condensate.

The balance of requirements or "make-up" must be so conditioned that when blended with the returns a satisfactory feedwater will result.

A satisfactory feedwater must be of virtually zero turbidity and of zero hardness to prevent scale. It must have suitable alkalinity. The total dissolved solids must be low enough to prevent the necessity of excessive blowdown from the boilers for the purpose of eliminating volatilization or carry-over of solids, especially silica, which would form deposits in the turbines, superheaters, and piping. The oxygen and carbon dioxide must be reduced to a minimum to prevent pitting of boilers and piping. The concentrated water in the boiler itself must be non-embrittling. This latter action is generally associated with free sodium hydroxide. To waters having an embrittling tendency suitable inhibitors must be applied, such as soluble nitrates, certain coordinated pH-phosphate control, and other chemicals.

In general, there are three methods for external conditioning of raw water for boiler use, all benefiting from presedimentation and filtration.

The first, and most widely applied, may be called the "modification" method, which may result in the precipitation and removal of virtually all of the temporary hardness, i.e., principally the carbonates of lime and magnesia, and the conversion of the sulphates to sodium salts, which are soluble and do not form scale.

A virtually zero hardness water can thus be obtained. With some of the modification systems, silica can be reduced to 0.5 to 1 part per million. The oxygen and carbon dioxide are substantially removed by deaerating feedwater heaters. If this method produces water of sufficiently low silica and total dissolved solids for the boiler pressure in question without excessive blowdown, it is entirely satisfactory and will be accomplished at minimum capital and operating cost.

Commonly used, but not fixed, standards for such maximum allowable concentrations in the boiler for various steam pressures are:

Boiler Pressure	SiO_2—ppm	TDS—ppm
2000 psig	3	
1000 to 1500 psig	5	1000
901 to 1000 psig	—	1250
751 to 900 psig	25	1500
601 to 750 psig	—	2000
451 to 600 psig	50	2500
301 to 450 psig	70	3000

For a given feedwater as shown by this table, the blowdown increases with boiler pressure. Thus, water entering the boiler with a content of 200 ppm. of dissolved solids would require a blowdown of 200/1000 = 20 per cent for 1500 lb., 200/2000 = 10 per cent for 750 lb., etc. Silica may be the limiting factor computed in a similar way. The heat loss of blowdown may be reduced up to about 90 per cent at the higher steam pressures by direct utilization of the flash steam, and of the sensible heat by means of exchangers.

There is therefore an economic balance between the cost of feedwater treatment and that of heat recovery.

Water modification systems call for a combination of two or more of the following types of process: filtration; continuous or intermittent cold lime soda; continuous hot lime soda; sodium zeolite, hot or cold; hydrogen zeolite; deaeration.

The best combination depends on the character of the raw water, per cent of make-up, and the pressure at which the boilers are to be operated. If the water impurities are chiefly carbonates of lime and magnesia, a hot lime soda process would be indicated, as practically all of these carbonates would be precipitated and removed. Residual hardness may be removed from the effluent by a second stage consisting of hot phosphate or hot sodium zeolite. An alternate plan for such a water would be hydrogen zeolite and sodium zeolite with mixed effluents.

If the water contains mainly sulphates and chlorides, a sodium zeolite might be suitable provided the resultant soluble solids in the water and carbon dioxide in the steam are not too high for the boiler conditions. No solids are removed by this system but are merely changed to soluble sodium salts.

The tendency is decidedly away from the cold lime soda systems due to their lower efficiency in results and operation.

None of the above modification systems remove sulphates and chlorides. Silica is not removed by either hydrogen or sodium zeolite but can be reduced in the hot lime soda process with a sludge blanket in which dolomitic lime or magnesium oxide are frequently used. With a cold system ferric iron compounds are used for silica removal.

The second method of water conditioning is that of evaporation, which results in distilled water of high purity. In general, it is the most expensive of all the systems, both as to investment and operating cost.

It is rarely used in industrial plants for boiler purposes and has been confined chiefly to central steam plants where the power is generated on a straight condensing basis with only a very small requirement for treated make-up water.

The third method of raw water conditioning is by a process of demineralization. This is a new development and at present high in cost, but also of high hope for the future. The cost of chemicals may range to around five times that of the modification processes, but the effluent is on a par with distilled water and is less costly. Systems of considerable size have been in successful operation for more than a year.

Clarified raw water is first passed through a cation or hydrogen exchanger, which reduces all salts to their acids. This exchanger is regenerated with acid.

Following this stage several layouts are possible, selection being based on the analysis of the raw water. One of these would degasify as the second stage, while the third and final stage would be resin deacifiers (anion exchangers) regenerated with alkali. The silica would be adsorbed in the latter.

Thus far we have considered treatment of water outside of the boiler only. Generally it is advisable to apply internal treatment as well for final adjustment of such factors as alkalinity, oxygen adsorption, foaming reduction, sludge dispersion, embrittling inhibition, etc.

With very good raw water supply or small make-up requirements, internal treatment alone may be sufficient.

While raw waters may contain other impurities than those mentioned in our discussion, practically all can be conditioned by one of the methods described.

Selling safety to the worker in the woods

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SAFETY is a field where the much-used phrase "it can't be done" is often disproved. In such fields as aeronautics, electronics, and physics results achieved today far surpass the dreams of a few short years ago. And in many respects this is nowhere more in evidence than in woodlands operations. Across-the-board improvements in logging operations have created such a new "bush camp" era that the lumberjack of a few years ago would think he was in Paul Bunyan's heaven if he were to return today. But there is still a lot of progress to make, particularly with regard to methods of dealing with the lumberjack as an individual.

Too often we look on him as a shiftless "ne'er-do-well" who in some strange manner could not possibly respond to the same appeals which influence other men and because of this erroneous belief the results that are achieved when we try to influence him in a given direction have not been too imposing.

But the time is coming when results will be greatly improved because of a change in hearts and minds, a change that will be brought about as more proof is available to show that the fellows who make up the payrolls of woods operations are by and large "ordinary guys," much like many of the men who work in the mills, with very similar aspirations and reactions.

To emphasize the point let's look at the jackladder and wood yard operation of the LongLac Pulp & Paper Co. mill at Terrace Bay, where, during the past four seasons, more than 700,000 cords of wood have been handled. There are, undoubtedly, many hazards in this phase of operations. Pike poles, pickaroons, hookeroons, 4-foot wood manually piled into headers sometimes 25 feet high (in order to contain 25,000-cord piles within the scope of the fire towers), reclaiming wood from frozen 100-foot piles at temperatures down to 45° below zero, and large numbers of temporary workers during summer months (many of them bush workers) all are factors that might contribute to a high injury rate. Due to the fact that every LongLac employee is exposed to the same intensive accident prevention program, however, only one three-day lost time accident has occurred on the jackladder operation in four seasons, while the wood yard experience since mill start-up in 1948 shows only two disabling injuries, with five work days lost. The combined frequency rate (accidents per million man hours) for the jackladder and wood yard is 8.21. The mill frequency rate since start-up is 7.89. This is a variation of only 4 per cent. It is therefore obvious that accidents can be prevented even among temporary workers on hazardous work by the application, with conviction, of sound accident prevention practices.

Woods work hazardous

That work in the woods has particular hazards not common to industry is not to be denied. It must also be admitted that problems of supervision, piece work, and isolation are often present, but these obstacles are not insurmountable, and a little ingenuity will do much to put across a well thought out safety program.

And if a shock is needed to make safety specialists determined to leave no stone unturned in their efforts, let's not lose sight of the fact that 77 caskets have been required to bury the bodies of the men killed on pulpwood logging operations in Ontario woods during the past seven years, while in the same period well over 14,000 men have suffered disabling lost-time injuries. Based on actual man-hours worked, 26 men are killed in Ontario woods for every man killed in the mills, and 25 men suffer lost-time accidents in the woods for every one injured in the mills. In the woods a man is killed on the average of every 260,000 man-hours worked, while almost 7,000,000 man-hours is the average in the mills.

Seven years ago the average frequency rate in Class "A" pulp and paper mills in Ontario was 33.6. Last year it was 13.5, an improvement of almost 60 per cent.

Seven years ago the average frequency rate in the woods was 60.3. Last year it was 70.4, almost 17 per cent worse.

Bear in mind when considering these facts that inadequate accident prevention efforts due to misconceptions, disinterest, lack of a basic philosophy of accident prevention, or methods utilized have a far greater bearing on the high frequency of injuries than occupational hazards of any sort.

Excellent examples of this contention are the many hazardous industries that have very low freqeuncy rates due to effective accident prevention programs. For instance, the steel and chemical industries both have experiences that are only half as severe as the all-industry average.

If we are prepared to rid ourselves of misconceptions such as those which surround our attitudes toward the bushworker, and if we are fired with the will to do an effective job of preventing injuries in the bush, we still need a basic philosophy of accident prevention and methods by which to implement it.

Planning a safety program

A broad outline of some of the thinking and planning that has been at the roots of the LongLac accident prevention program at Terrace Bay will provide the basic philosophy and some methods that ought to be of value in selling safety in woods operations.

Confronting LongLac in the early days of 1949 (the first calendar year of operation) were facts that were somewhat foreboding:

1. Estimates of from three to seven years were given by safety experts as to the amount of time required to develop an effective safety program in a new mill.

2. New sulphate pulp mills that had gone into operation in Ontario prior to LongLac's start-up had suffered disabling injuries at the rate of one every four or five days during the first two or three years of operation, with frequency rates well above 50.

Such negative prospects were a challenge to the safety staff's ingenuity. The thought of having a LongLac employee at Terrace Bay suffering a disabling injury every four or five days spurred immediate action.

Since statistics indicated that 80 to 90 per cent of all accidents were due to

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*Mr. Soughton is service and safety supervisor at LongLac's mill in Terrace Bay, Ont. This article was delivered as an address before a meeting of the Northwestern Branch of the Ontario Pulp and Paper Makers' Association, held at Dryden November 28, 1951.

human not mechanical hazards, it was firmly resolved to expend the bulk of time and effort in this direction, since it seemed logical to assume that an accident prevention program might be immediately successful if it could deal effectively with those human failures.

Basic philosophy

To do this a basic philosophy that could be sold to everyone—to supervisor and workman alike—was needed. Since the theme "Safety First" did not appear to have these qualifications, "Production with Safety" was adopted. This theme ought to be readily applied in any woods operation.

To implement this philosophy or theme it was determined that accident prevention would be a function of the line organization, stemming from the mill manager through the superintendents and foremen in the same manner as any other management function. If top management in an organization is not "sold" on safety, if top management backing leaves something to be desired, it is the safety director's duty to do a sound selling job in this direction. Top management wants to do the right thing and will if properly informed. This job must be done and done well if a safety program is to produce the desired results.

In order to deal effectively with the various human failures that cause so many accidents we must also influence the minds of those who are the working force. And while terms applied in this field may carry such labels as creating "safety consciousness" or "safety awareness," the techniques that have paid-off are directly related to sound advertising principles. The same dynamic effort must be incorporated in selling safety as is used in successfully selling any product. Simple reminders aren't sufficient. A single small sign won't do the trick. Something more spectacular is what people are used to in modern day advertising. Call it "tinsel" if you will, LongLac did at Terrace Bay, but it was decided early the first year that there wasn't enough of it. An increase in the amount used brought almost immediate results.

Results at LongLac

Throughout 1949, the first calendar year of operations, there were 18 disabling injuries (an average of one every 20 days) for a frequency rate of 13.76, believed to be the safest pulp mill start-up on record on this continent. This was stressed in a telegram from William H. Burnell, first vice president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers wherein he stated in part: "Today is the anniversary of the signing of the first labor agreement at Terrace Bay. . . . I particularly wish to compliment all concerned on the wonderful safety record accomplished during that period which is unparalleled in the history of the pulp and paper industry for the first year of operations."

The second year of operations, 1950, saw a sharp reduction in accident experience. Disabling injuries were cut to eight (an average of one every 45 days), and the frequency rate dropped to 5.91. Work days lost were reduced to 67 from the 656 of the previous year, while man-hours worked increased to 1,350,000 from 1,308,000. Results achieved placed LongLac in second position in Class "A" of the Ontario-wide pulp and paper safety contest and brought a "Certificate of Achievement" from the National Safety Council. At the same time production increased and the quality of our product improved.

During 1951, with almost 11 months gone and more than a 1,300,000 man-hours worked, disabling injuries have been cut to three (an average of only one every 100 or so days), and the frequency rate is well below 2.3.

The basic philosophy of "Production with Safety" and the methods used to implement it have been beneficial.

It is not enough, however, to talk about a philosophy and then cite results achieved. Specific factors that have become a part of the firm's safety program should be noted. Actually it is doubtful whether there is much in LongLac's set-up that differs greatly from techniques used by others who have good safety programs. The similarity of the philosophies and methods of operation between Terrace Bay and that of Brunswick Pulp & Paper Co. of Brunswick, Ga., is amazing. Brunswick's story was told at the recent National Safety Congress in Chicago by its president, E. J. Gaynor. Situated as the respective mills are in widely separated geographical locations, it proves that certain fundamental principles applied to accident prevention efforts can and will bring results if faithfully applied with a firm conviction that they will work. Too often our efforts fail because we do not believe we can succeed. We must believe in our ability to achieve results or we limit the extent of our success. And when we are dealing with the lives and limbs of our people, nothing but the maximum of belief and effort is sufficient.

"Tinsel" at LongLac

Now let's look at some of the "tinsel" used to create that "safety awareness" so all-important in combatting those "human" hazards which cause so many on-the-job accidents. The safety staff believes, for example, that it's very important to make some impressions on every LongLac employee at the start of each day or shift. To accomplish this the firm has used the following:

1. A Jumbo Billboard—This billboard uses the 10 by 12-foot posters published monthly by the National Safety Council. It also proclaims the "Quality Production with Safety" theme and has interchangeable space for "Yesterday's Production" and "Safe Days" since the last accident.

2. A Safety Contest Scoreboard—This huge scoreboard 7 by 15 feet shows the relative positions of 11 pulp and paper mills in an area safety contest. A 2 by 3-foot interchangeable panel on this sign gives room for any special announcements.

3. A Doghouse—This is a full size three-dimensional doghouse with a cut-out dog, both perched atop a 6-foot pole. It is reserved for any LongLac unit which has less than 100 safe days to its credit and there is room on the side for the names of any such units.

4. Safety Slogan Contest Board—On this board (6 by 7 feet) each week is posted on a 22 by 28-inch card the safety slogan for the week with the amount of the current jack ppt. Each week $5 is added to the jack pot, and an employee's name is drawn from personnel department Kardex records. If the slogan is missed, the jack pot grows by $5 per week. Keen interest has been maintained in this simple contest for 2½ years, with the jack pot reaching as much as $35.

5. Frequency Rate Comparisons—LongLac's yearly experience since start-up is set forth on a 4 by 6-foot panel with a brief description of what constitutes a frequency rate.

6. "Production with Safety" Panel—The "Quality Production with Safety" theme is repeated, with "production" and "safe day" totals changed daily.

7. The impact of what has been noted so far is made before an employee punches his time card. The time card itself has imprinted on it in red a safety slogan. (These slogans change with each change of time cards.)

8. Safe Man-Hour Thermometer—Across the top of the 8-foot thermometer is the challenge, "Let's Make it a Million Safe Man Hours." (A previous objective of a half-million safe man-hours was achieved during the spring and summer of 1951, when the project completed 728,000 consecutive safe man-hours before a disabling injury broke a run of 192 safe days.)

9. Unit Scoreboard—This 3 by 9-foot scoreboard keeps the score of disabling injuries during the current year of all 20 units into which the project is divided.

10. Individual Unit Scoreboards—These scoreboards have a green cross for safety at the top containing the "Production with Safety" theme. Each board is supplied with interchangeable numbers, and there is room on the board for the best previous safe-day record and the current safe-day total. A small black-

board section provides space for any brief message, safety or otherwise. A soft board panel, on which a single safety poster or minutes of safety meetings can be posted, projects at the bottom.

11. Giant Safety Slogan Panels—Six of these double-sided safety slogan panels made of light framing and sign cotton are routed through six strategic locations in the mill at monthly intervals. Each month a new panel is started through the circuit, and the panel used for six months in all six locations is retired.

12. Bulletin Boards—A regular bulletin board service, under glass, is maintained in six mill and office locations, and National Safety Council and other safety posters are utilized in the safety sections of these boards.

Other reminders

Quite apart from signs and posters use is also made of the following:

1. Daily Letter—The letter contains quality and production information, special announcements and a safety message. This is one of the most important factors in the program, since it is a daily reminder to each man in the line organization that safety is very much on the agenda. And this daily letter provides a regular communication channel for important items that would otherwise require special memos. It takes time to get out this daily letter, but it is time well spent.

2. "Quality Production with Safety" Sheet—This single sheet was originated by the accident prevention committee. It is devoted to production and safety matters. Focusing attention on the basic theme of operation, which is printed in three colors across the top of the sheet, this means of communicating with every employee creates many valuable impressions.

3. Terrace Bay News—This weekly medium is utilized to carry safety messages along with regular news items.

4. "Co-operation"—(This bi-monthly publication of the parent organization, Kimberly-Clark Corp., is distributed to all corporation employees.) From a safety standpoint, particular use is made of this publication in recording the achievements registered by the safety efforts. Much of this record is kept pictorially as this is the only medium, at present, for obtaining a wide distribution of pictures of safety activities and accomplishments.

In elaborating on the various factors of the LongLac program covered to this point there is one purpose in mind and that purpose is to illustrate the extent to which the firm goes, apart from its accident prevention committees and indoctrination practices, to sell safety in a general way to everybody and then keep them sold by repeated reminders. What works specifically in one safety program does not necessarily prove equally effective in another situation. However, where a sound principle works well in someone's safety program, it will probably do as good a job if given a chance elsewhere. A principle which is well to copy is that you cannot overdo the variety of appeals which you use to sell safety so long as those appeals are geared to the basic philosophy underlying your program.

Committees

As for committees in LongLac's safety program there are three types.

1. Terrace Bay Accident Prevention Committee—This committee is responsible directly to the mill manager, who acts as its general chairman. The committee is also made up of all mill superintendents (who may invite to the meetings a foreman of their choice); local union officials (president, vice president and secretary); the chairmen of each departmental safety committee (who may be either salary or hourly rated men); the plant nurse, and the safety supervisor, who acts as secretary.

This committee oversees all safety activities, reviews statistical reports, determines mill wide safe practices when necessary, institutes stunts and contests and considers matters referred to it by the various departmental safety committees.

2. Departmental Safety Committees—Each department has a departmental safety committee that is responsible to the superintendent of that department.

These committees, whose composition is determined by the superintendent concerned, conduct regular inspections of their respective departments, consider items of safety brought to committee members by employees of the department, help to plan general meetings of all members of the department and in many instances decide subjects for such meetings.

3. Special Committees or Sub-committees—These committees may be set up by the accident prevention committee or any departmental safety committee, and they may cover such items as: special events, contests, good housekeeping inspections, or they may be set up to study a particular safety problem.

It is important to emphasize that all committees that are in any way a part of the accident prevention program are responsible to either a superintendent or the mill manager. This keeps the responsibility for safety in the hands of the line organization and therefore eliminates any possibility of divided authority.

Personal approach

Reference to one very important phase of the safety program has been purposely left to the last. It is the personal approach to the employee from the time he joins the ranks. At the very outset, as soon as he is on the payroll and before commencing work, the subject of accident prevention is personally covered with him by the safety supervisor. Time consumed by this phase of the indoctrination program varies from 15 to 40 minutes, depending on whether an individual or a group of up to eight men is involved. The employee is told the story of LongLac's accident prevention program and the success achieved. Reference is made to the union agreement booklet, which contains all the mill rules governing every phase of operation and including penalties for violations of these rules. Rules related to safety are included. For example, violating "Do not Start Tag" regulations is listed as a reason considered sufficient for immediate discharge. (Some may disagree with the principle of penalties tied to compulsory rules. However, clean cut rules set forth in writing, with penalties that are fair to all concerned, serve a very useful purpose in keeping that small minority in line who would probably never stay within the law even though exposed to all the appeals to which normal people respond. In other words, LongLac applies the same principles that are effective in every day law enforcement.)

In addition to general information, which also includes reference to the first aid room, necessity for reporting all injuries promptly, safety shoe program, prescription goggle program, smoking areas, prompt action necessary if in contact with chemicals and the extent to which the company has gone to provide a safe place to work, specific reference is made to the department where the new employee is scheduled to work. If there are general hazards in that department they are noted; (for example, all jackladder men are urged to make sure tools used are sharp and to have respect for them) but specific job instructions are left up to the foreman, and the new employee is so informed. The company also attempts to get across the thought that it has some idea of "that strange feeling" that even the most seasoned workman has when he starts a new job. And the fact is stressed at LongLac that "safety is everybody's business" and that the safety program will only continue to be successful as each person takes a personal responsibility for his own safety and the safety of his fellow workmen. We generally get a smile by injecting "it's mostly a case of using what's between your ears all the time."

As has been indicated, individual job instruction is the responsibility of the foreman. To maintain uniformity and assure that nothing will be overlooked

individual job write-ups are used during this training process. These job write-ups (which contain safety measures related to the job) are reviewed yearly by foremen and the workmen concerned, and changes made, subject to management approval, often relate to accident prevention. Where it is not possible to use the job write-up approach, a foreman is expected to take the time to assure himself that the men working for him "know the score." Sound advice in this regard is very ably set forth in a little booklet, "How to Sell Safety" published by the Bureau of National Affairs, Inc., Washington, D.C.

Summary

To reemphasize five points I have tried to make:

1. Let's not say "it can't be done" in woods operations.
2. Let's rid ourselves of the misconceptions that have plagued us in the past.
3. Let the appalling loss of life and limb in the woods spur us to greater accident prevention efforts in the future.
4. Let's adopt a basic philosophy of operations in the woods or at least a clear cut theme that will provide a necessary hitching post as well as an objective for woods safety programs.
5. Let's use every means at our disposal to sell safety both up and down the line with an enthusiasm that is infectious.

We must thoroughly organize our efforts, bearing in mind that the doctrine of chance is the bible of the fool. Safety must be sold for the same reason that clothes must be sold—people need both.

A technical research director discusses . . .

The testing of paper

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In teaching any college subject, it is always most satisfying to the teacher, and generally more stimulating to the student, when the material can be presented in a logical sequence of basic or fundamental principles and related corollaries. Paper testing, unfortunately, is very difficult to teach on this basis, since much of the available material on the subject is of factual and descriptive nature. This circumstance probably derives from the antiquity of the paper industry, which until fairly recent times resulted in considerable secrecy and favored the development of craftsmen rather than men with the scientific approach. In the field of production the situation has been largely reversed in recent years, but the field of paper testing, while strongly invaded by scientific personnel, has still remained cloudy, not systematized and often confusing.

There have been many attempts to put paper testing and the related subject of pulp testing on a firm scientific basis, and in this connection the efforts of Clark, Doughty and recently Steenberg in Sweden, Rance in England, and Mason in Canada deserve especial mention. The efforts of these men have gone a long way in increasing our knowledge of the fundamental nature of paper, but almost anyone concerned with the subject will agree that there is still a long way to go before the subject is on a firm, scientific foundation.

The types of testing done on paper fall in several different categories, which can be grouped into such broad general classes as (1) handling tests, (2) use tests, (3) empirical tests and (4) fundamental tests. Some of the various types of tests are discussed below, although no attempt has been made to classify all the various tests made on paper.

Handling Tests

Handling tests, the forerunner of modern testing methods, consist of a personal evaluation of paper for appearance, feel, sizing, and physical strength by looking through the paper at a light source, by rubbing the paper lightly between the fingertips, by wetting with the tongue, and by rattling, folding, or tearing the sheet between the fingers. At one time this method of testing was probably the only means of evaluating paper and it is still used to some extent by practical papermakers.

There are two serious drawbacks to this type of testing: first, the results are difficult to express in numerical form, and secondly, a considerable amount of experience is required to interpret the results and to translate them into effective action. However, when the necessary experience has been gained, it is possible for a paper machine operator to obtain considerable information from handling tests that is useful in making rapid machine adjustments. An experienced backtender working on a familiar grade can tell the basis weight of the paper within one or two pounds by simply feeling the sheet.

Variations in formation are readily seen by visual observation and even an inexperienced person can see the difference in formation between a well formed sheet having the even, milky appearance of a ground glass plate and a poorly formed sheet having an uneven, cloudy appearance; but here again it requires considerable experience to arrive at an informed decision as to the adequacy of the formation to the strength and other requirements of the paper. Likewise, tearing the wet paper to examine for fiber length or tearing the dry paper to determine the degree of fiber bonding and fiber length also requires considerable experience in interpreting the results. Chewing a piece of paper to gauge the hardness of the stock and shaking a sheet of the paper to determine the rattle or stiffness are examples of other handling tests that are even more difficult to evaluate than those already mentioned.

Use Tests

Use tests are those methods of testing paper which are based on the utility of the paper for a specific purpose. These methods of testing are probably the most

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valuable in paper testing from the standpoint of determining the suitability of paper for a particular converting operation, but they have the disadvantages of requiring special and often costly equipment, elaborate preparation of the specimen, special training of the operator, and the results must usually be expressed qualitatively in comparison to the results obtained on some standard paper.

Evaluation of paper for printing quality by direct testing on a regular press or on a laboratory proof press is an illustration of a use test. This test is an extremely valuable one for printing papers when carried out under standardized conditions so that the results can be compared to those obtained on a standard paper of known printing qualities. A similar but more complicated use test is one used for evaluating coating rawstock by which the unknown base paper is first coated with a standard coating mixture, dried and calendered, all under standardized conditions, and then the coated paper evaluated by printing on a proof press. When the results are compared to a standard base paper of known performance which has been coated, calendered, and printed under identical conditions, a good indication can be obtained of the performance to be expected of the rawstock in practice.

The testing of corrugating medium by first fabricating a sample of the paper on a laboratory corrugator and then testing the sample of board for resistance to compression on the Riehle tester or on a regular tensile tester equipped with special jaws is another use test that is claimed by some to produce results closely indicative of those to be obtained in commercial practice. Still another example of a use test is the evaluation of saturating paper for making plastic paper base laminates, where it is common practice to evaluate the paper in the laboratory by impregnating the paper with resin, drying, and then pressing together several plies of the impregnated paper at high temperature and pressure to produce a laminate which is put through a series of tests to measure the water pick-up, flexural rigidity, compression resistance, and impact strength of the laminate.

There are many other examples of use tests, but those already mentioned illustrate typical testing procedures of this type in which the paper is generally treated, fabricated, and then tested in the laboratory under conditions that simulate actual production operations. These methods of testing are in wide use, but are pretty much limited to research projects or special studies since they are generally too time consuming for routine control testing except possibly as a means of checking on occasional samples. The testing procedure, often quite complicated, and conditions are generally chosen in different laboratories to correspond to the conditions at that mill so that as a consequence the results obtained in one laboratory generally do not agree with those obtained in other laboratories.

In order to obtain greater uniformity, it might conceivably be possible and worthwhile to prepare a set of standard procedures for the different use tests which could serve as a general outline for anyone wishing to make those tests. Such procedures would have to be quite general in order to permit wide latitude in choosing conditions, but if the methods were carefully written they should be of great value in standardizing conditions and would make it easier to correlate results obtained in different laboratories.

A single use test would in some instances have multiple value, e.g., an accepted method for coating, calendering, and printing paper in the laboratory could conceivably be used not only for evaluating coating base stock but also for evaluating the adhesive, pigment, and other ingredients in the coating mixture. It would be helpful to standardize all the materials required in a particular use test so that only the material under study would be varied, but this would obviously be difficult to do.

Empirical Tests

A great many of the tests used in the paper industry are designed to measure a particular physical property of paper but have the disadvantage that the property measured is an empirical one for which the results obtained are dependent on the dimensions of the sample and on the arbitrary instrument design.

Among the common tests in this category are the bursting strength test, folding endurance test, abrasion test, and other similar tests. All these tests must be classed as empirical for either or both of the reasons mentioned above or for the reason that they measure two or more individual properties which cannot be separated and which may appear in different ratios to produce a given result. For example, in the folding test, which is designed to measure the ability of paper to withstand flexing and which has recognized value for measuring the ability of high grade paper to maintain its quality on aging or on repeated handling, the result that is obtained depends not only on the flexing qualities of the paper but also on the tensile strength of the paper.

In this test, measurement is made of the number of double folds which a strip of paper 15 mm. in width can stand before the tensile strength of the paper falls below an average value of 1 kg and consequently it is possible to increase the folding quality merely by increasing the tensile strength of the paper, assuming of course that the flexibility of the paper is not affected. Likewise, reducing the tensile strength tends to reduce the folding endurance, and when the tensile strength becomes less than 1 kg the folding endurance must be regarded as zero.

This dual dependency of folding endurance on flexibility and tensile strength explains why the folding endurance of paper generally rises rapidly in the early stages of beating during the period when the tensile strength of the paper is rapidly increasing and then rises less rapidly or decreases in the latter stages of beating when the paper becomes increasingly brittle. Another disadvantage of the folding endurance test is that the area of the specimen under test is very small, which results in considerable variability in the test results. This extreme variability requires that a large number of tests must be carried out to obtain reasonable accuracy and this, together with the time required to make individual tests on high grade papers which often fold 500 to 1000 times or more, makes this test poorly suited to cases where accurate results are required in a short period of time.

The bursting strength test, while another useful test, has the same disadvantage as the folding test in that the results are dependent upon two individual properties of the paper, in this case tensile strength and elongation. Thus, it is possible for two papers having quite different combinations of tensile strength and stretch to have the same bursting strength, or it is possible for a given paper to decrease in bursting strength while gaining in tensile strength if the stretch of the paper is decreased sufficiently as might conceivably result from increasing the draw on the wet sheet on the paper machine.

The beneficial effect of high moisture on stretch explains why the bursting strength of paper decreases less than the tensile strength when the moisture content of the paper is increased. If the once suggested but highly criticized formula $PR = 2T$ for calculating bursting strength from tensile strength and stretch values can be relied on at all, it should be possible for bond paper with a constant bursting strength of 30 to have a machine direction tensile strength which varies from 5, 6, to 7 kg. if the corresponding stretch of the paper is 4.4 per cent, 3.0 per cent, and 2.0 per cent, respectively.

The tensile strength test has the advantage over the bursting strength and folding endurance tests of measuring single values of tensile strength and stretch, but this test does not measure fundamental values since neither the straining nor the stressing is done at constant rate, and furthermore the results of tensile strength are reported in kilograms per 15 mm. of width rather than

in the more conventional units of stress per unit of area. Breaking length is a somewhat more meaningful unit, since it embodies a strength-to-weight ratio, but it too is affected by the shortcomings in instrument design. The stretch that is measured by the tensile tester is a complex value that includes the elastic and inelastic elongation as well as the elongation that occurs during fiber separation at the time of rupture. Thus, the tensile strength instrument leaves a lot to be desired from a fundamental standpoint although it, like the other instruments mentioned above, has served the industry well in a practical way and will undoubtedly do so for many more years.

Fundamental Tests

Fundamental tests have the valuable property of producing results that are easily understood and can be related to other fundamental test results by definite laws. Because the results of fundamental tests are independent of the dimensions of the specimen, it is possible to make valid comparisons of results obtained on papers of different weights, which is not the case with the empirical tests mentioned above.

It is true that the results of empirical tests are sometimes converted to a common weight basis by dividing by the basis weight and multiplying by 100, but this correction is not always a valid one, particularly when comparing results of the tear test. Thus, fundamental tests are desirable from the scientific standpoint although they may not be as valuable to the practical man under existing conditions as some of the use tests and conventional empirical tests described above.

This lack of practicability of fundamental tests could be overcome, however, through the increased use of these tests so that the knowledge regarding their relationship to the various use requirements of paper is increased. If this could be achieved in all cases, it should be possible, for example, to predict the printing qualities of a given specimen of paper from such properties as its density, hardness, smoothness, and resistance to oil penetration. Considerable emphasis is placed on these individual tests in mills making printing papers but it is not possible, and may never be possible, to predict such a complex characteristic of paper as its printability from the results of the individual properties contributing to this characteristic.

When it comes to a question of determining the suitability of paper for structural purposes such as for wrappings, bags, boxes, cartons, and cups the problem is somewhat easier than for printing papers although it is still not a simple one. There is no sound reason why paper to be used for structural purposes should not be tested by the same methods used for other structural materials such as rubber, plastics, or metals since paper differs from these other materials only in having either a lower inherent extensibility and/or lower strength.

A knowledge of the stress-strain characteristics of paper should be of inestimable aid in evaluating paper for structural purposes by measuring such properties as instantaneous elastic modulus, recoverable and non-recoverable creep, and relaxation at various loads. The isolation of these individual properties for detailed study should yield information of far greater value than a simple ultimate-strength reading such as that obtained on most of the present paper testing instruments.

Relatively new instruments (1) (2) (3) (4) for measuring true stress-strain-time relationships have been made available, which utilize load-weighing mechanisms that involve no significant movement of the jaw attached to the load indicator. So far these machines have not enjoyed much use in the paper industry because of their high cost and the fact that their practical value in paper testing has not been clearly demonstrated, but they bid fair to become highly useful in the future.

Paper Specifications and Quality Control

A fact that frequently baffles beginning students of the paper industry is that there are no industry-wide accepted standards for the various types of different papers. This does not mean, however, that paper is sold without control of its quality, since in fact most paper must conform to specifications established either by the user or by the manufacturer. In recent years there has been increasing interest in the development of satisfactory specifications, and many of the large paper companies as well as the large consumers of paper, such as insurance companies and the Government Printing Office, have well established specifications for each of their major paper products.

Basis weight and dimensions of paper have long been used in writing specifications, and other common tests are sometimes used, including fiber composition, chemical tests such as ash content, rosin content, and pH, physical tests such as folding endurance, burst and tensile, and optical tests such as brightness and opacity. A good specification should contain only those values which are significant to the user, and for best results these should be weighted according to their significance.

Chamberlain (5) uses four tests as a basis for setting up specifications on paperboard, which are mullen, tear, brightness, and dirt with dirt and brightness having a higher rating factor than the strength test. In setting up specifications other methods of sampling, calibration of instruments, and testing must be agreed on by both the manufacturer and the consumer. The paper industry is fortunate in this regard in having available the excellent standard testing procedures of TAPPI and ASTM.

Specifications may be unworkable unless they are based on sound statistical principles that take into account the variability of the product. Commercial papers exhibit deviations of considerable magnitude in most properties except basis weight and caliper (6), and the extent of these deviations should be considered together with the requirements of the user in setting up workable specifications.

A specification calling for freedom from dirt is obviously impractical, and likewise a specification calling for rigid adherence to a definite strength requirement may also be impractical. In most cases, rigid adherence to the letter of the specification is not demanded if only minor deviations occur or if retesting results in conformity. However, the question of whether or not to accept borderline product is generally left up to the personal judgment of the tester, whereas it would be far more satisfactory if the answer were obtained by statistical means.

Those interested in paper quality have at their disposal reliable and scientific methods of analyzing their product for variability. By fairly simple means it is possible to obtain the answers to such questions as whether there is a significant difference in the means of different results, or how many readings must be taken to reduce the chance of selection to an acceptable probability. The problem of product quality control in the paper mill is admittedly more complicated and in this regard statistics is only in its infancy, but the infant promises to be vigorous and productive during the maturing process.

References

(1) Instron tensile testing instrument, manufactured by Instron Engineering Corp., Quincy, Mass.

(2) MTE testing machine, manufactured by Baldwin Locomotive, Baldwin, Pa.

(3) Stress-strain Recorder, manufactured by Lorentzen & Wettre, Stockholm, Sweden.

(4) Olsen Electromatic testing machine, manufactured by Tinius Olsen Testing Machine Co.

(5) Chamberlain, L. B., Paper Trade Journal, Vol. 131, No. 14, October 5, 1950, pp. 30-34.

(6) Staff of the Institute of Paper Chemistry, Instrumentation Studies, Paper Trade Journal, Vol. 106, No. 3, January 20, 1938, pp. 28-30.

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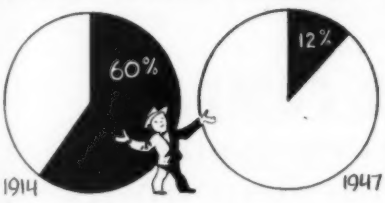
In 1914, New England and New York accounted for 60% of the wood pulp used by the nation . . . 33 years later, the production in the rest of the country had increased to the point where New England's contribution amounted to about 12% of the national output.



As early as 1800 set-up boxes of paperboard were made by hand to accomodate the hats of Quaker ladies and gentlemen . . .

Odd Bits

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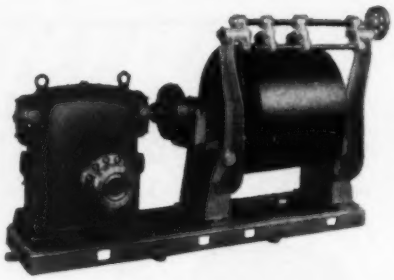
During the pioneer days of papermaking, a team consisting of vatman, coucher and layman could turn out about five reams of paper in an average day..

Machine *speed* measures your *profit*



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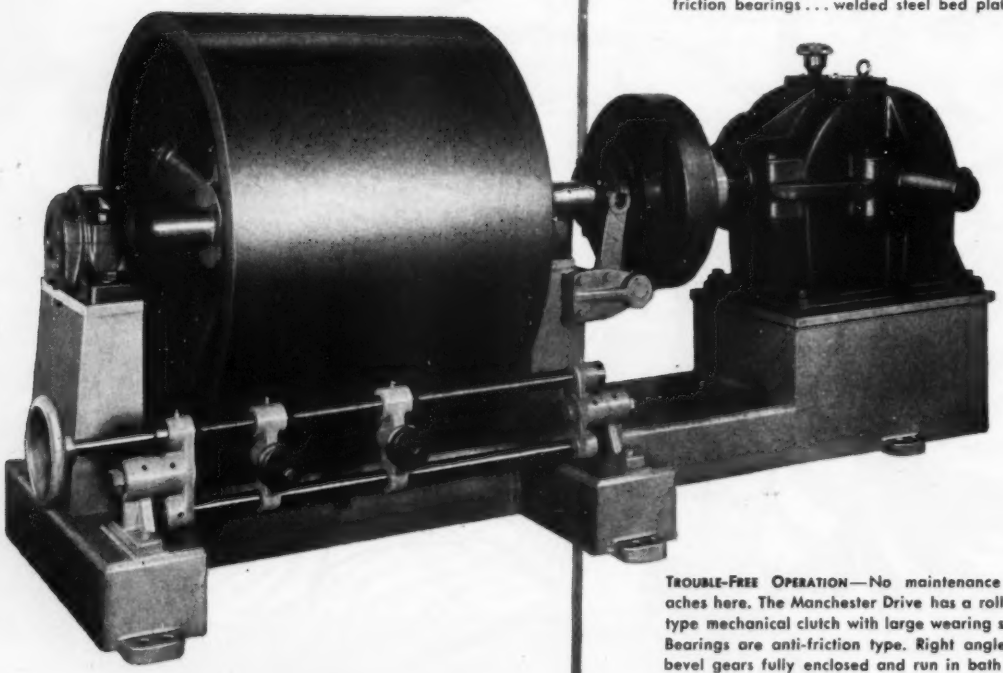

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Douglas Jones, Executive Secretary, Technical Sec., C.P.P.A.

C. P. P. A. Anticipates $600,000,000 Five-Year Expansion

A. W. J. DYCK, Ph.D.
Consulting Editor

Expansion, increased production, and diversification of products were the outstanding achievements of the Canadian pulp and paper industry during 1951. Meeting in Montreal January 23-25, an estimated 1,500 delegates to the 39th annual meeting of the Canadian Pulp and Paper Association were told by leaders in the industry that growth over the next five years may amount to $600,000,000 in capital investment. As in previous years, the manufacture of pulp and paper is retaining its lead in the Canadian economy, where it ranks first in capital investment, production, value of exports, payment of wages, and employment of labor.

Held in conjunction with the CPPA convention was the 38th meeting of the Association's Technical Section. During the section's annual gathering, 31 papers were read and 17 group discussions held on problems and developments in technical matters relating to pulp and paper manufacture. (THE PAPER INDUSTRY will carry some of the more important of these papers and discussions in its March issue.)

Chosen chairman of the executive board of the CPPA for 1952 was E. M. Little, president of Anglo-Canadian Paper Mills Ltd. H. C. Lee, assistant chief engineer for Canadian International Paper Co., was elected chairman of the Technical Section.

Reviewing the activities of the Technical Section, Douglas Jones, executive secretary, paid tribute to the contributions made to the industry's progress by the section's 17 standing committees. The studies of these committees included electrical engineering methods, handling of materials in the mills, instrumentation, improved pulping processes, fundamental research, and use of waste materials. A major contribution to the solution of a national emergency was made by the Sulphite Committee, it was reported. By careful application of some of the ideas of this committee, the industry was able to conserve 22,000 long tons of sulphur during 1951.

New capital investment in pulp and paper mills during the 1946-1950 period was reported to be in excess of $360,000,000. Of this sum $230,000,000 was spent on the acquisition of new machinery and equipment, while $130,000,000 was used for construction purposes.

Expansion

On the basis of a survey made by the Association pertaining to investment plans for projects that will be completed before the end of 1953, it is estimated that total new capital investment for the period 1951-1955 will amount to more than $600,000,000. Should this estimate be correct, such an expansion would be 70 per cent greater than that experienced during the 1946-1950 period.

Such rate of growth naturally prompts the question: "Is industry over-expanding and is it repeating the mistakes of the 1920's?" In answer to this question, R. M. Fowler, president of the CPPA, referred to vastly changed world conditions. Today there are many more uses for wood fiber than there were in the 1920's, while continually expanding old uses are creating ever-increasing demands. Moreover, the depletion of wood reserves has set a limit to further expansion of the pulp and paper industries in many countries. The danger of overproduction is therefore much less than it was some 25 years ago. With constantly increasing world demands for wood products and the limited forest resources in many pulp and paper producing countries, it is inevitable for Canada—which, excluding Russia, possesses the most extensive areas under coniferous vegetation—to become increasingly more important as a supplier of wood products.

New all-time records were reached in the Canadian output of pulp and paper. Known for many years as the largest exporter of newsprint, Canada in 1951 also became the leading exporter of pulps. Exports of pulp and paper amounted to 77 per cent of the industry's output and constituted 24 per cent of the total value of Canada's exports.

Production

Total output from all mills was 9,600,000 tons, which exceeds the production in 1950 by about 9 per cent. The gross value of this output was $1,200,000,000. Although some new mills came into production in 1951, the attained record of increased output was largely due to capacity operation and expansion of previously-existing plant facilities.

Of the 9,100,000 tons wood pulp produced, about 6,800,000 tons were converted by Canadian industry into paper, paperboard, and other products, while 2,300,000 tons wood pulp were exported. The exported pulp—80 per cent of which was shipped to the United States, 10 per cent to the United Kingdom, and 10 per cent to other countries—consisted of 1,900,000 tons chemical and 400,000 tons mechanical pulp.

Newsprint production in Canada was in excess of 5,500,000 tons, an increase of 4 per cent over the 1950 production. The bulk of the newsprint, amounting to 4,790,000 tons, was shipped to the United States, where the annual increase of consumption over the 1946-1950 period has averaged about 400,000 tons. It is this growing consumption of newsprint in the United States which has been the cause of the world-wide newsprint shortage. Current indications, however, are that there is a slowdown in the growing rate of consumption of newsprint in the United States and, provided this trend continues, an easing of the newsprint shortage may be anticipated.

Paperboard production in 1951 totalled 762,000 tons; wrapping paper 262,000 tons; specialty papers 123,000 tons; building paper and boards 217,000 tons. All these values represent substan-

tial increases over the production of the preceding year.

The pulp and paper industry exported 77 per cent of its total output in 1951, which constituted 24 per cent of Canada's export trade.

Diversification

The trend toward greater diversification of products is continuing. While not so long ago the Canadian pulp and paper industry was mainly a newsprint industry, today only 56 per cent of the industry's output consists of newsprint. In 1951 the increase in newsprint production was 4.7 per cent while the increase of other products rose to 18 per cent over the 1950 production.

This trend toward greater diversification is likely to continue with ever-increasing acceleration, although the time envisaged by some research scientists when newsprint will merely figure as a by-product of the pulp and paper industry is still a long way off.

As a logical consequence of the recent realization of more lucrative returns from investments in other than newsprint facilities, marked emphasis was placed on research during the last year. The amount expended by the industry on research at the Pulp and Paper Research Institute was about six times the expenditure allocated for this purpose in 1948.

Election of Officers

In addition to Mr. Little, the new chairman of the executive board, other CPPA 1952 officers are as follows: vice chairman, D. W. Ambridge, president of Abitibi Power & Paper Co. Ltd., and H. S. Foley, president of Powell River Co. Ltd.; new honorary vice chairman is C. R. Whitehead of Montreal.

New officers of the Technical Section in addition to Mr. Lee are as follows: vice chairman, R. L. Fraser, assistant to the mills manager of Abitibi Power & Paper Co. Ltd.; and councillors, Dr. W. Gallay of E. B. Eddy Co., J. R. W. Grieve of Brown Corp., J. B. Jones of Ontario Paper Co. Ltd., T. R. Moore of Anglo-Newfoundland Development Co. Ltd. and W. E. Soles of Anglo-Canadian Pulp & Paper Mills Ltd.

R. G. MacDONALD, center, receives the congratulations of Dr. Paul V. Sangren, president of Western Michigan College, as Mrs. Louisa Durham Mohr, president of the Michigan State Board of Education, looks on.

Macdonald Honored at Western Michigan

R. G. Macdonald, secretary-treasurer of TAPPI, was given an honorary degree of doctor of science by Western Michigan College, Kalamazoo, at its midwinter commencement January 27. Mr. Macdonald was principal speaker at the graduation ceremonies.

His appearance in Kalamazoo marked his 25th anniversary with TAPPI. He was appointed acting secretary-treasurer of the association in December 1927 and was officially elected to that position in February of the following year. During his tenure with TAPPI the organization has grown tremendously, becoming an important factor in the paper industry. In addition, he has for the past four years been editor of the magazine, "Tappi," which he created.

Mr. Macdonald is a graduate of the Massachusetts Institute of Technology. After receiving his BS degree in chemical engineering, he joined the staff of Pejepscot Paper Co., Brunswick, Maine. In 1924 he joined the research department of Oxford Paper Co., Brooklyn, N.Y., following which, in 1926, he became market research department manager for "Chemical and Metallurgical Engineering," leaving that for his present post.

The department of pulp and paper at Western Michigan College is headed by Dr. Alfred H. Nadelman.

APPA Plans 75th Anniversary Meeting

Celebrating its diamond jubilee, the American Pulp and Paper Association is to stage its annual convention at the Waldorf-Astoria Hotel in New York, N.Y., February 18-22. Advance reports from convention offices indicate that the gathering promises to be one of the largest in the history of the organization.

Among outstanding men who will speak at the open meeting on Friday, February 22, will be the following: D. C. Everest, president of Marathon Corp., who will discuss the future of the industry; Cola G. Parker, president of Kimberly-Clark Corp., who will speak on the tax situation and the relation of government spending to industry, and R. M. Fowler, president of the Canadian Pulp and Paper Association, whose subject will be Canada's problems and how they tie in with U.S. economy. George Olmsted Jr., president of S. D. Warren Co. and also of APPA, will deliver his report on the state of the industry at the open meeting.

The Diamond Jubilee Dinner is to be on the 21st in the grand ballroom of the Waldorf-Astoria. Other open meetings will be the materials committee and the export committee both on the 21st.

Annual TAPPI Meeting to be During APPA Gathering

The annual national meeting of the Technical Association of the Pulp and Paper Industry is to be staged in New York, N.Y., February 18-21.

The gathering will open with a general session featuring an address by K. P. Geohegan, national president. Other speakers at this session will include R. G. Macdonald, national secretary; J. N. Stephenson of the joint text book committee, and Fred H. Klaer Jr. of Ranney Method Water Supplies, Inc. Mr. Klaer will discuss, "The Over-all Water Supply Situation Throughout the United States Pulp and Paper Regions."

Technical discussion sessions will be held on the final three days of the meetings. Subjects will include: water, structural fibrous materials, papermaking (fourdrinier), preparation of papermaking materials, acid pulping, fundamental research, corrugated containers, hydraulics, wet strength, alkaline pulping and chemical engineering, papermaking (cylinder), and chemical methods and pulp testing.

President Geohegan will preside at the annual luncheon on Thursday, February 21. During the program, Raymond S. Hatch of Hudson Pulp & Paper Co. will receive the TAPPI medal. Walter J. Murphy, editor of the Institute of Engineering Chemistry, will speak on "Scientific and Technical Manpower Problems."

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- Upgrading 2 sulphite pulp and screenings
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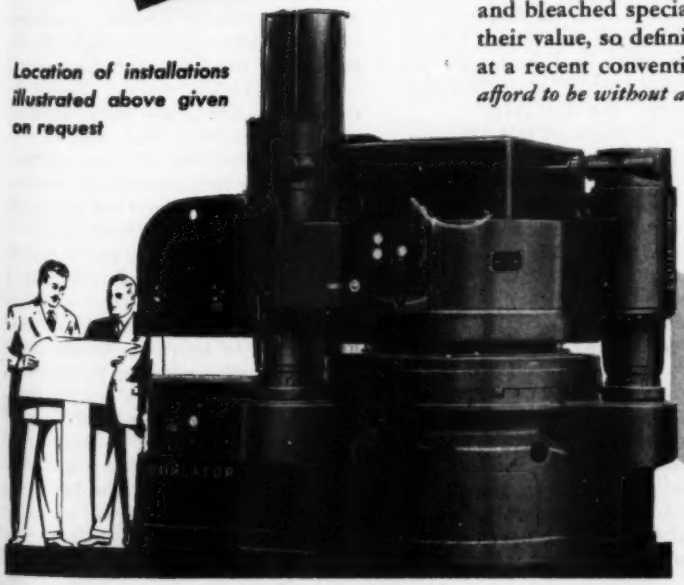

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Chicago Tappi Corrugating Conference: (L to R) M. L. Hamilton, Container Corporation of America; Paul Harrison, Velocity Steam Production Engineering, Inc.; Harry J. Bettendorf, *Fibre Containers and Paperboard Mills;* V. V. Vallandigham, Kelco Co.; G. A. Zinkil, Central Fibre Products Co.; G. A. Farrah, National Container Corp.; L. H. Grubbs, Johnson & Johnson Co.; R. L. Cassaday, The Jackson Box Co.

Chicago TAPPI Holds Corrugating Conference

The second annual corrugating conference was held by the Chicago Section of the Technical Association of the Pulp and Paper Industry on January 21st. The afternoon and evening sessions held at the Chicago Bar Association featured six speakers who covered various aspects of the subject such as quality control, practical operating problems, and customer reactions. Over 130 persons were in attendance at the meeting which was presided over by Vance V. Vallandigham, of Kelco Company, who is chairman of the TAPPI Chicago section. G. A. Zinkil, special representative, Central Fibre Products Company, Quincy, Illinois, was moderator of the conference which presented the following speakers and subjects.

"Component Material Requirements," G. A. Farrah, ass't to the vice president, National Container Corp., Tomahawk, Wis.

"Operation of the Corrugator," R. T. Cassady, vice president, The Jackson Box Co., Cincinnati, Ohio.

"Quality Control in the Box Shop," M. L. Hamilton, technical superintendent, Container Corp. of America, Chicago.

"How Costly is it to Operate your Modern Equipment with Horse and Buggy Methods of Handling Steam?" Paul Harrison, president, Velocity Steam Production Engineering, Inc., Chicago.

"Technical Personnel is Expensive," Harry J. Bettendorf, president and editorial director, *Fibre Containers & Paperboard Mills,* Chicago.

"The Customer Speaks," L. H. Grubbs, buyer, Johnson & Johnson Co., Chicago.

Component material requirements

Mr. Farrah outlined the characteristics of liner board and corrugating medium necessary to produce high quality boxes. He pointed out that appearance and performance are the two important qualities of shipping containers and that the component materials must have the proper characteristics so that these qualities can be achieved. Furthermore, the component materials must have the qualities that will help achieve efficient low cost operation in the fabrication of boxes. With regard to liner board, properties that effect box *appearance* are weight, caliper, finish, odor, formation, ink receptivity, and cleanliness.

Liner board properties that affect box *performance* are weight, caliper, tearing strength, tensile strength, moisture resistance, scuff resistance, bursting or mullen strength, puncture resistance, ring stiffness and folding endurance.

Liner board properties that affect box *fabricating* operations are weight, caliper, tearing strength, tensile strength, moisture content and scuff resistance.

Operation of the corrugator

In his talk Mr. Cassady traced his company's reputation for good operation to good equipment which is well maintained and operated by employees who know what they are doing, who wish to do a good job, and who have the confidence and respect of management. He expressed the opinion that increased technical knowledge and control are necessary. The need for more technical knowledge was obvious, he felt, from comparison of today's price of a corrugator in the hundreds of thousands of dollars, as compared with about $27,000 some 30 years ago. Speeds of 500 feet per minute today (possibly 1,000 in the near future) indicate the same need, he said; in fact, companies will soon find it worthwhile to spend thousands of dollars just to take sheets off high speed corrugators. Such machines, although engineered to run at high speeds, will not attain the resultant economy if the educated and trained manpower isn't available.

Quality control in the box shop

In discussing this subject, Mr. Hamilton outlined the functions of quality control department as follows:

(1) Meeting the requirements as defined by the shipper, the customer, and the government. (2) Improve and maintain efficient production by policing materials, policing waste and policing quality. (3) Developing answers to sales problems with regard to decorative and protective coatings, special constructions, and customer complaints. (4) Keeping abreast of new materials and equipment so that the plant may be kept at a high state of efficiency.

Steam system on corrugators

Mr. Harrison first described the concept of a steam system which his company introduced for corrugators some years ago. This turned attention to the real goal of heat actually transferred to the corrugated board, as contrasted with the apparent heat of the corrugated rolls or the double backer hot plates. This is known as the velocity system, which takes into consideration the fact that high heat transfer demands adequate steam flow at a rate in keeping with the heat to be transferred. If the heating surface is insulated by air inherent in all water or condensate films, the flow is reduced removing more than is generally recognized. He said that gas films offer 15 times the resistance and condensate films offer 60 times the resistance as the same thickness of metal wall.

Attacking this problem was a system of speeding up the steam flow by means of a control unit. Feed water was first deaerated as much as possible; speeded flow helped to return condensate more rapidly as well as removing air films. At the same time a pulsating action (alternation of a slightly raised and lowered steam pressure) tended to flash some condensate on heating surfaces back into steam and by turbulence to enhance the sweeping action of the stepped up steam flow. The pulsating or unsteady flow also made use of a principle familiar in

electricity that an unsteady flow permits more volume to flow through a circuit than will a steady flow. The result, he said, was greater heat transfer on existing equipment so that production rates in most instances were increased substantially.

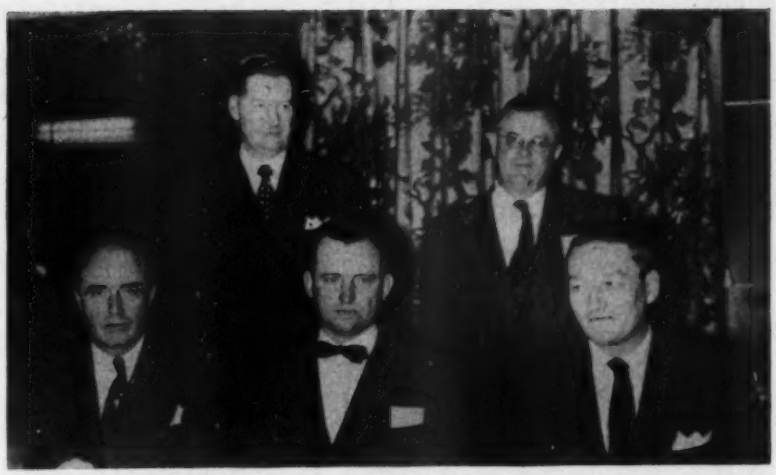
Technical personnel is expensive

In developing this subject Mr. Bettendorf traced the history of the industry from the time when corrugated boxes were first used for express shipments in about 1895, and outlined the effect of the Pridham decision in 1914. He pointed out that the regular slotted container, which still represents 70 to 90 per cent of corrugated box output, was one of the vital reasons for quick growth of the corrugated box industry. The regular slotted container fits straight line production and has been the most economical box for most purposes. He gave a number of figures on the growth of the paperboard industry and showed how it has far outdistanced the growth of the pulp and paper industry in general.

The industry has now grown where corrugated value alone is over a billion dollars per year. The industry is now too prominent to avoid its responsibilities to customers, railroads and the general public for safe keeping of goods in transit. Therefore, it is necessary that an intelligent technical approach be followed so that the industry might continue its dynamic growth through greater service and better products.

The customer speaks

Mr. Grubbs stated that his company, Johnson & Johnson, used 2 to 3 million square feet of board per month, in the form of some 250 different types and sizes of boxes in its Chicago plant. Corrugated board ranges from non-test to 350-lb. test and with A, B and C flutes, etc. In short, the company's wide variety of packaging needs are supplied by an equally wide variety of board and board products. In discussing the subject, Mr. Grubbs pointed out that the purchasing department of his company keeps in close contact with the shipping department and the claim and adjustment department to keep track of damage to products during shipping and warehousing. It doesn't matter how fine quality the product is, unless it arrives at the merchant's warehouse in good condition. In general he felt that the board and boxes purchased by his company have been of satisfactory quality. He did emphasize that one of the most important qualities in boxes for his company is uniformity. He did comment on a number of points where he thought improvement might be made, scoring, taping and stitching, design, and printing.



SPEAKERS AT THE MICHIGAN SUPERINTENDENTS meeting gather before the session. Standing (L to R), William Race, Sutherland Paper Co.; Frank H. Stowitts, Michigan Carton Co. Seated (L to R), George N. Carleton, Detroit Sulphite Pulp & Paper Co.; Bruce W. Martin, American Box Board Co., and Maxwell Bardeen, Lee Paper Co.

Michigan's New Paper Machines Discussed at Supt.'s Meeting

Michigan's new paper machines were discussed by five top paper mill executives at the December 13 meeting of the Michigan Division of the Superintendents Association.

Maxwell Bardeen, president of Lee Paper Co., Vicksburg, described his firm's new machine as a Beloit cantilever type Fourdrinier capable of producing fine, writing, printing and production papers at speeds up to 500 feet per minute. The drive of this machine, according to Mr. Bardeen is of a fundamentally new design, permitting sectional speed adjustments of highest accuracy.

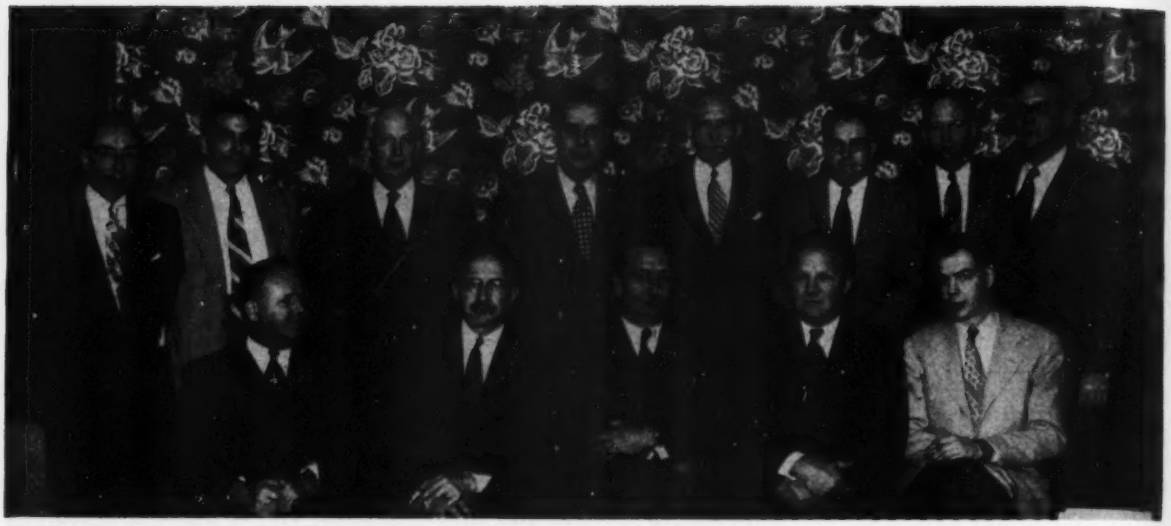
George N. Carleton, president of Detroit Sulphie Pulp & Paper Co., related that his company's new machine is a Beloit combination Yankee Fourdrinier designed for speeds up to 1,800 feet per minute, and that, at the present time, it is running at speeds of from 1,300 to 1,400 feet per minute. Mr. Carleton said that the machine produces lightweight uncreped tissues for wrapping and converting purposes, and that its most conspicuous innovation is a pressure stock inlet.

William Race, president of Sutherland Paper Co., Kalamazoo, declared that the first paper machine was installed by his firm in 1921, that three more machines were added in 1928 by the merger with Standard Paper Co., and that the fourth machine was added only a few years ago. The newest machine is a Black-Clawson eight-cylinder unit, equipped with 113 driers, which is capable of producing paperboard at speeds up to 400 feet per minute. The machine is supplied with the necessary fibre furnish from a new continuously-operating stock preparation system. A new automatic layboy has been added to the layout during the past few months.

Bruce M. Martin, manager of production at American Box Board Co., Grand Rapids, reported on the plans of his firm to have a new paper machine in operation in the near future in its Filer City mill. The machine is to be a Black-Clawson cantilever-type Fourdrinier. Among features of the unit mentioned by Mr. Martin were the following: The stock will be delivered from a pressure inlet to a 110-foot wire; the two suction presses will have brass shells without rubber covers; the first section of dryers, consisting of six cylinders, will be operated without felts; there will be 52 main dryers, operated at steam pressures of up to 100 pounds per square inch; 16 felt dryers will keep the dryer felts in good operating condition; the machine will operate at a speed of 900 feet per minute and will gradually be speeded up to 1,500 feet per minute.

Mr. Martin further related that the pulp mill is about to be modernized; that two hydraulic barkers have been added; that continuously-operating digesters will be installed, and that washers of the screw press type will insure cleanliness of product and simultaneously will reduce the quantity of pulp mill waste water to the lowest possible volume.

Frank H. Stowitts, vice president in charge of manufacturing for Michigan Carton Co., Battle Creek, told of the trials and tribulations encountered when putting a new paper machine in operation. In referring to his company's relatively new machine, one of the first machines to be built after World War II, he said that it is designed for a speed range up to 5,000 feet per minute and that it is capable of producing up to 224 tons of paperboard per day.



PROGRAM DETAILS for the joint Kalamazoo meeting were discussed at a special session. Front row (L to R), Dr. Alfred H. Nadelman, Western Michigan College; F. C. Goodwill, St. Regis Paper Co.; A. E. Harold Fair, guest speaker; Richard H. Peeters of the Superintendents Association, and John Dam of TAPPI. Back row (L to R), Raymond L. Barton, past president and a trustee of the Superintendent's Association; Leon Mimms, Kalamazoo Paper Co.; Harry E. Weston, secretary and treasurer of the Superintendents Association; Glen Sutton, national Superintendents president; K. P. Geohegan, national TAPPPI president; William F. Hathaway, Kalamazoo Vegetable Parchment Co.; R. H. Hurst, KVP, and H. L. Vanderberg, A. E. Staley Mfg. Co.

Training of Personnel to Combat Shortage of Workers Advocated

Training on the mill level was proposed as an answer to the current shortage of personnel by A. E. Harold Fair in an address before a joint meeting of the Kalamazoo Valley Section of TAPPI and the Michigan Division of the Superintendents Association January 10 at Kalamazoo's Hotel Harris. Mr. Fair, president and general manager of Alliance Paper Mills, Ltd., Toronto, emphasized the need for trained papermakers "if we are to produce more paper."

Nearly 400 industry representatives and suppliers attended the annual gathering. Richard H. Peeters, chairman of the Michigan Division of the Superintendents Association, presided. John R. Dam Jr., chairman of the TAPPI section, assisted in planning the program.

"The New Challenge"

Speaking on the subject, "The New Challenge," Mr. Fair pointed out that the paper industry is unbalanced "in that personnel policies have not kept pace with the advance in operating methods. It is obvious that we can no longer take a chance on hiring a man who is simply looking for a job. Papermaking is a skilled operation."

The speaker described two paradoxes that have grown from the present situation. The first is that closer technical controls, bringing processes nearer mechanical perfection, have removed training opportunities offered an operator "by finding his way out of difficulty by getting into it." The second paradox is that of security. Security for the worker is a fine thing, but without condemning the policy behind it, Mr. Fair questioned the cost. He suggested that in the long run it might be possible that society would benefit more with less security for the individual and more for industry.

Calls for Training

Calling on industry technical associations to enter the personnel field, Mr. Fair suggested that training programs be devised to assure a continued supply of competent papermakers. As to the form the personnel program might take in its training phase, the speaker suggested both inter-mill exchange and a training school supported by the industry. The school might be in the form of a small training mill with small units of up-to-date design, to be used solely as a training unit for senior operators.

"The important point," he concluded, "is that the industry has a problem on its hands that is not only serious but difficult to solve. These two associations (TAPPI and the Superintendents) embrace a group of men who should tackle it. No group in the industry is more capable of finding a solution."

Both the national president of TAPPI, K. P. Geohegan of Howard Paper Mills, Inc., Dayton, Ohio, and the national president of the superintendents association, Glen Sutton of Sutherland Paper Co., Kalamazoo, were present at the meeting. Serving as toastmaster was Frederic C. Goodwill of St. Regis Paper Co., Kalamazoo.

Coming Events

Feb. 17-21—American Pulp & Paper Association, annual meeting, Waldorf-Astoria Hotel, New York, N.Y.

Feb. 18-21—National Council for Stream Improvement, Inc., Waldorf-Astoria Hotel, New York, N.Y.

Feb. 20—Salesmen's Association of the Paper Industry, annual meeting, Waldorf-Astoria Hotel, New York, N.Y.

TAPPI meetings

Feb. 18-21—Annual meeting, Commodore Hotel, New York, N.Y.

May 5-8—Third Coating Conference, Sherman Hotel, Chicago.

American Pulp and Paper Mill Superintendents Association meetings

Feb. 21—Michigan Division, Hotel Harris, Kalamazoo.

March 20—Michigan Division, Hotel Harris, Kalamazoo.

March 21—Miami Valley Division, Cincinnati Chemical Works, Cincinnati.

April 17—Michigan Division (joint meeting with Kalamazoo Valley Section of TAPPI), Hotel Harris, Kalamazoo.

April 24—Miami Valley Division, Manchester Hotel, Middletown, Ohio.

May—Miami Valley Division, Orr Felt & Blanket Co., Piqua, Ohio.

May 9-10 — Northwestern Division, Rockford, Ill.

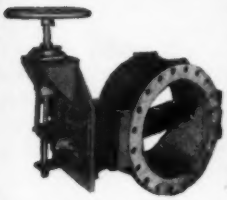
May 9-10—Pennsylvania-New Jersey-Delaware Division, Yorktowne Hotel, York, Pa.

June 17-19—National meeting, Book-Cadillac Hotel, Detroit, Mich.

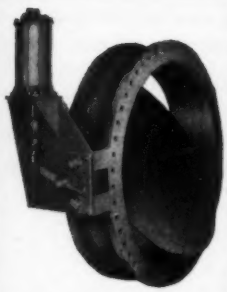
R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

No. 797—24-inch heavy duty electric motor operated valve. Handwheel for manual use in case of current failure.



No. 700—20-inch class "B" cast iron valve equipped with heavy duty handwheel control and threaded reach rod.

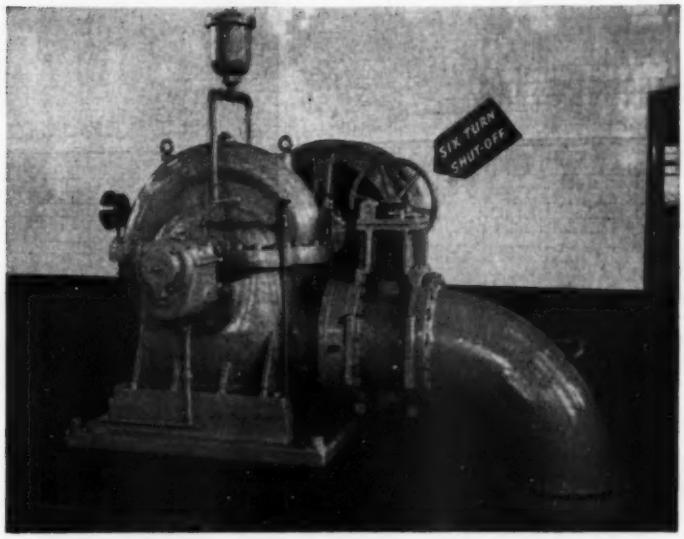


No. 627—Cylinder operated 60-inch heavy duty valve (either pneumatic or hydraulic control).

•

R-S Valves are synonymous with the simplified control and shut-off of any material that flows or is forced through a pipe, under a wide range of pressure and temperature.

•



ATLANTIC CITY Simplifies PUMP SHUT-OFF

New pumping units of the modern Atlantic City Pumping Station supplying water for this seashore resort are equipped with 125-pound handwheel operated R-S valves.

The valve illustrated above is closed in a matter of seconds (only six handwheel revolutions required) before the pump is started in order to prevent an overload on the pump and motor. The valve is then opened gradually and easily regulated according to demand.

Such valves can be equipped with hydraulic cylinders (tapped into the pipe line before and after the pump). As long as the differential pressure remains above a predetermined value, the cylinder will hold the valve open. Power or mechanical failure will cause a drop in the differential pressure, and the cylinder will close the valve automatically. Water hammer is impossible since the valve closes only as fast as the adjustable cylinder bleeds.

Specify R-S Valves for simplified construction and operation.

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Plus or Minus 1½%

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5 to 150 Points

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Actually, this equipment does six important jobs:

- **Holds wet end fluctuations to plus or minus one point**
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- **Makes corrections by regulating flow of stock *but only when a trend has been established***
- **Provides a continuous, permanent record of wet end caliper**
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Result . . . consistently uniform quality of product . . . a tremendous saving in raw stock . . . a worthwhile reduction in waste . . a big saving in operator's time.

If you're interested in bigger and better production for less money, talk things over with one of our engineers. There's no obligation. Write today.

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Automatic
CALIPER and WEIGHT CONTROL

WRITE FOR THIS BULLETIN

Contains full details about the Hurletron equipment . . . shows what it is doing in leading mills . . . includes interesting charts and photos. Ask for Bulletin No. 211.

ELECTRIC EYE EQUIPMENT COMPANY

10 WEST FAIRCHILD STREET • DANVILLE, ILLINOIS

The Paper Industry Names in the News

OUTSTANDING SERVICE to the University of Maine achieves for J. Larcom Ober (right) the coveted Black Bear Award; making the presentation is Prof. John B. Calkin

Ober Receives Maine's Black Bear Award

J. LARCOM OBER, vice president of Scott Paper Co., Chester, Pa., and chairman of the Pulp and Paper Foundation of the University of Maine, Orono, was recently presented the University's Black Bear Award. The prize is awarded by an alumni committee "in recognition and appreciation of outstanding service in promoting university spirit."

The ceremonies took place at Chester, with Prof. John B. Calkin, director of the U. of M. department of industrial cooperation, making the presentation.

Mr. Ober, a member of the class of 1913, served on the Alumni Council in 1930 and was Alumni Day marshal in 1938. He was a member of the group that founded the school's Pulp and Paper Foundation. A member of the finance committee of the Foundation in 1950, he is currently chairman of the executive committee.

Claud Christiansen to Investigate Corrosion

CLAUD CHRISTIANSEN, widely known chemical engineer, has been appointed to supervise a new research project by the Pulp and Paper Research Institute of Canada. He will study methods of preventing corrosion in equipment for making kraft paper. The research is being sponsored by 13 pulp and paper companies throughout Canada.

Corrosion represents a loss of hundreds of thousands of dollars in the industry and, according to L. R. Thiesmeyer, president of the Institute, appears to be increasing. The project is being undertaken in close cooperation with similar investigations in the United States, Scandinavia, Australia and elsewhere.

Mr. Christiansen was formerly associated with Potlatch Forests Inc., Lewiston, Idaho. He is an honor graduate in chemical engineering of Oregon State College. Previous to his connection with Potlatch he was with Crown-Zellerbach Paper Co., Camas, Wash.; St. Regis Paper Co., Tacoma, Washington; St. Mary's Kraft Corp. in Georgia, and Weyerhaeuser Timber Co., Longview, Wash.

Elis Olsson

S. G. Olsson

Olsson Succeeds McDonald at Chesapeake Corp.

The board of directors of Chesapeake Corp. of Virginia, West Point, have elected *ELIS OLSSON* president to succeed M. C. McDonald, who was recently named to head Great Northern Paper Co. Mr. Olsson, according to the announcement, will remain as chairman of the board.

Elected vice president was *S. G. OLSSON; W. C. GOULDMAN* remains as vice president and secretary; *O. D. DENNIS* was elected vice president and treasurer, and *E. S. GRAY* was elected assistant secretary.

Kyle Ward Joins Institute Staff

DR. KYLE WARD, recently chief of the Cotton Fiber Div. of the Southern Regional Research Laboratory at New Orleans, has been named to head the Cellulose Group at the Institute of Paper Chemistry, Appleton, Wis. The announcement was made by Westbrook Steele, president of the Institute.

Mr. Ward was with the Bureau of Chemistry and Soils of the Department of Agriculture as a junior chemist from 1924 to 1928 and as a collaborator from 1936 to 1939. He was a research chemist for Hercules Powder Co., Wilmington, Del., from 1928 to 1936. Mr. Ward joined the staff of the Southern Laboratory in 1939.

Strathmore Elects Treasurer, Director

Stockholders and board members of Strathmore Paper Co., West Springfield, Mass., recently reelected all present officers and directors, while naming *PAUL A. WILKS* treasurer and *HENRY D. JOHNSTON* a director.

Mr. Wilks succeeds F. Nelson Bridgham, who has held the joint office of president and treasurer since the death in July of George E. Williamson. He joined Strathmore in 1929 as a member of the cost department. He was made head of the firm's West Springfield cost department in 1930 and was appointed chief accountant in 1933. In 1946 Mr. Wilks became controller and was elected assistant treasurer in 1947.

Mr. Johnston has been with the firm since 1927. He was appointed assistant to the vice president in charge of production in 1929. In 1948 he became assistant to the president. In addition, he has been industrial relations manager since 1945.

P. A. Wilks

H. D. Johnston

MELVIN H. BAKER, president of National Gypsum Co., has been elected to the new position of chairman of the board. *LEWIS R. SANDERSON,* executive vice president, has been named to succeed Mr. Baker. Other recent National Gypsum executive changes include those of *FRED A. MANSKE,* vice president in charge of manufacturing, who was named vice president of operations, and *WELLS F. ANDERSON,* produc-

tion manager, who was chosen to succeed Mr. Manske.

WILLIAM S. STUHR has been reelected president of United Board & Carton Corp., Syracuse, N. Y. *MORRIS KAY* was reelected chairman of the board and *PAUL de GATEGNO* and *HERMAN TUBLITZ* vice presidents. Reelected to the board of directors were *CARL K. BLUM, CARLO CORSUTI, HANNS DITISHEIM* (chairman of the executive committee), Mr. Gategno, *PERRY KOPLIK, CHARLES PASSANNONTE, CHESTER E. PURO, HARRY STUCKER,* Mr. Stuhr, *THOMAS A. TERRY,* Mr. Tublitz, and *WILLIAM C. ZAGARINO.*

ARTHUR P. JEWETT, formerly general manager of Provincial Paper Ltd., has been appointed vice president for sales of the parent company, Abitibi Power & Paper Co. Ltd. He succeeds Thomas A. Hendry, who has retired on a pension.

ROBERT W. LYONS, former assistant vice president of Kimberly-Clark Corp., Neenah, Wis., in charge of woodland operations, has been promoted to the position of vice president. *C. G. COSENS,* Toronto, in charge of related woods operations in Canada for the company, will assume the post of general manager of all woodland operations.

CHARLES G. EUBANKS, Memphis, Tenn., mill manager for Kimberly-Clark Corp., has been elected a director of the Memphis Chamber of Commerce.

WALTER STEARMAN, Atlanta, has joined the staff of Wyant & Sons Paper Co. as office manager.

ROY DIETERLEN, advertising and sales promotion manager for Diem & Wing Paper Co., was chairman of Cincinnati's celebration of Printing Week, which was held January 13 to 19.

Spiegel Elected to Head Gaylord Corp.

EDWIN J. SPIEGEL has been elected president of Gaylord Container Corp., St. Louis, to succeed the late Clifford W. Gaylord. He has been vice president and treasurer of the firm since its formation in 1937 and will continue to serve as treasurer as well as president. He is also a director of Gaylord and a member of the executive committee.

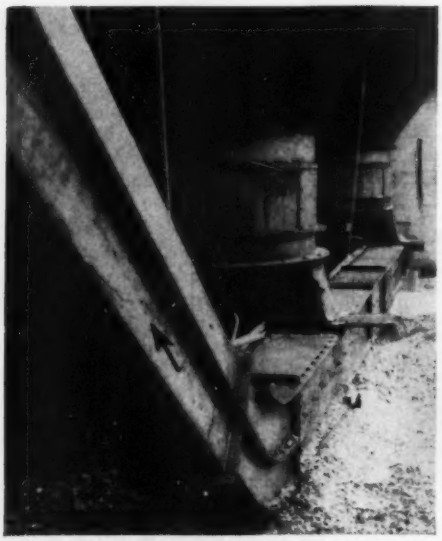
A native of Fort Wayne, Ind., Mr. Spiegel came to St. Louis in 1918 and in 1920 became associated with Robert Gaylord, Inc., a predecessor to Gaylord Container. He is vice president and member of the board of Fairfield Paper & Container Co., Baltimore, Ohio, and of Dresden Paper Mills Co., Dresden, Ohio.

E. J. Spiegel

R. A. Huston

ROBERT A. HUSTON, manager of industrial relations for Kalamazoo Vegetable Parchment Co. since 1944, has resigned that position and is now vice president of Fuller Mfg. Co. in charge of public and industrial relations.

DR. RALPH M. LINDGREN, research director for the U. S. Division of Forest Pathology in the Gulf States since 1947, has been transferred to Madison, Wis., where he has general supervision of the Division's research on the decays, stains, and other fungus defects of wood



Left: Horizontal feed section receives wood chips from storage silos and elevates to adjacent building and digesters. S-A Circular Bin Dischargers under each silo, feed chips into the REDLER.

Handle WOOD CHIPS

Easier

Faster

At Lower Cost

with

REDLER

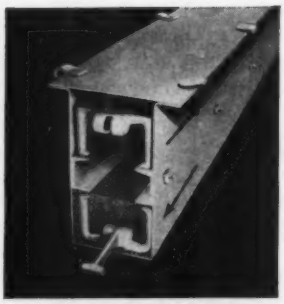
"Continuous-Flow"

Conveyor-Elevators

Wood chips move in a compact stream through the casing of a REDLER which conveys and elevates horizontally, vertically, up inclines and around bend corners. REDLERS often combine the functions of a feeder, a conveyor and an elevator . . . in a single handling unit.

REDLER conveying action consists of skeleton flights linked together and moving through the totally enclosed casings to induce the gentle mass movement of material in any direction. Comparatively small cross section of REDLER casing means that less space is required and casings can be installed without major alterations to existing structures.

REDLERS are the modern, low-cost way to handle wood chips. Write for Catalog 140 which gives complete information . . . no obligation.



Cross-section of standard REDLER casing. This shows material moving with carrying flights in lower run and empty flights returning in circuit fashion in the upper run.

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50 years experience with bulk handling

STEPHEN S-A ADAMSON MFG. CO.

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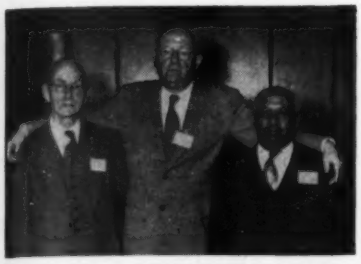
DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

products. He is also in direct charge of the Division's largest field research laboratory, which works in cooperation with the Forest Products Laboratory of the U. S. Forest Service. Dr. Lindgren's association with the southern wood products industry began in 1928, when he cooperated with the Southern Forest Experiment Station in finding ways of reducing the staining and molding of freshly sawn timber.



THIRTY-FIVE YEARS' SERVICE to Sutherland Paper Co., Kalamazoo, Mich., is the achievement of each of the men shown above as they attended a banquet honoring the firm's long-time employees. Of the 139 persons present at the gathering, only L. W. Sutherland (center), founder of the company; James Bachelder (left), and J. Maurice Goodwin had been with the firm since its founding in 1917. Mr. Sutherland is now chairman of the board of directors

JOSEPH C. WILSON, president of Haloid Co., Rochester, N.Y., manufacturer of photographic paper, has been elected president of the Rochester Chamber of Commerce.

EDWARD HARTSHORNE has been appointed manager of the research and development department, Olin Cellophane Division, Olin Industries Inc. He has been with the firm since 1934, when he joined the Western Cartridge Co. Division as a metallurgist.

MAX CLAMPITT, president of Clampitt Paper Co. and a director of the Texas Bank & Trust Co., has been elected president of the Dallas Manufacturers and Wholesalers Association for 1952.

DR. DESMOND M. C. REILLY, a Canadian industrial chemist, has joined the staff of the Midwest Research Institute in Kansas City, Mo. He was formerly a senior research chemist with Howard Smith Paper Mills Ltd., Cornwall, Ont.

A. WELCH, general manager and a director of E. B. Eddy Co., Hull, Que., has been appointed vice president and general manager.

LT. GEN. E. R. QUESADA, recently retired from the Air Force, has been elected vice president and a director of Olin Industries, Inc., East Alton, Ill. He will be directly concerned with the firm's contemplated expansion program in the field of cellulose and minerals.

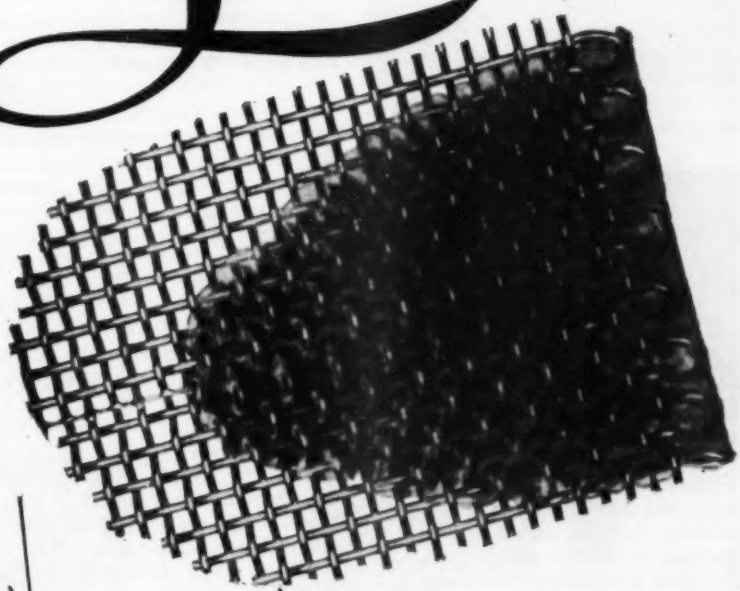
WALTER P. PAEPCKE, chairman of the board of Container Corp. of America, Chicago, was one of the 100 men and women who received Centennial Awards for the Northwest Territory at a special Northwestern University convocation in Evanston, Ill., December 2.

JOHN F. ZIESERL has been made Chicago district manager of the industrial chemical sales division of West Virginia Pulp & Paper Co. He succeeds John P. Harris, who retired recently.

ED PATTERSON, formerly with St. Regis Paper Co., has joined Time, Inc., where he will be concerned with purchasing paper.

FRANK S. WARD has been made general sales manager for Taylor Instrument Companies to succeed Raymond E. Olson, recently named president. Since 1945, Mr. Ward has been industrial sales manager. Succeeding Mr. Ward is

A NEW DEVELOPMENT BY Lindsay



Following considerable research and testing, we now make available to the paper industry a Fourdrinier wire with a plastic seam edge reinforcement (*patent applied for*). The plastic impregnation replaces the standard sewn steel edge and will be incorporated on future wires. This step forward is evidence of our pledge to "*never cease trying*". The Lindsay Wire Weaving Company, Cleveland 10, Ohio.

Lindsay WIRES FOR PAPER MILLS

ALBERT J. FLEIG, who, since 1945, has been divisional sales manager in charge of sales to the chemical, petroleum and canning industries. Named manager of a new industrial sales division was *GEORGE E. HELLER*, who will handle products sold to the chemical industry. *RICHARD N. POND* becomes a divisional sales manager, handling sales of industrial instrumentation to the petroleum and canning industries.

JOSEPH R. ALLENDORF has been made an assistant general sales manager for Eastman Kodak Co. He has been assistant to the general sales manager since March 1950. He will supervise and coordinate the operations of the firm's U. S. domestic branches.

Canadian Industries Ltd., Montreal, has announced the appointment of *J. D. CONVERSE* as development division manager; *DR. J. H. SHIPLEY* as assistant development manager, and *J. F. ARMITAGE* as manager of the real estate department.

R. BURKE MORDEN, president of Morden Machines Co., Portland, Ore., left in January on an extended tour of Morden installations in Mexico, Argentina and Brazil, as well as mills in Peru and Chile.

R. B. Morden

W. A. Gantner

Fulton Iron Works Co., St. Louis, has announced that *F. EDWARD O'NEIL*, president, has been elected president of the board of directors. He succeeds the late Mark C. Steinberg. Succeeding Mr. O'Neil as president is *WALTER A. GANTNER*, former executive vice president, while *HERBERT A. SCHUSTER*, controller since 1946, was elected vice president and treasurer. *HARVEY T. BOHLEY* was named secretary and assistant treasurer and *CHARLES T. HERRMAN* assistant secretary.

L. J. CARSON, former general manager of Link-Belt Co.'s Minneapolis plant, has resigned from his position as price executive of the machinery branch of the Industrial Materials and Manufactured Goods Div. of OPS and has been named general manager of Link-Belt's new Colmar, Pa., plant.

J. H. Metzgar

C. E. Cromwell

DeLaval Steam Turbine Co., Trenton, N.J., has announced two appointments in the sales staff. *J. H. METZGAR*, for merly a sales engineer, has been appointed sales manager of the Standard Products Div. *C. E. CROMWELL* has been made sales manager of the Commercial Div.

W. H. MATHESON JR. has been appointed general manager and a director of Schofield Paper Co. Ltd. Formerly manager of the firm's Halifax branch, Mr. Matheson succeeds *W. M. LUNDY*, who has retired. In other Schofield changes, *H. E. CROWLEY* has been made St. John branch manager and has been succeeded as manager of sales by *W. W. McCORMACK*.

JOHN L. FULLER has been appointed to the newly created administrative post of manager of research and technical services for Reliance Electric and Engineering Co., Cleveland. Since September 1950 he has been technical coordinator in the engineering department.

DAVID CAMPBELL, International Paper Co. of Camden, Ark., has been elected vice president of the Keep Arkansas Green Association.

Lunkenheimer Co., Cincinnati, has announced a general reorganization of sales territories and executive appointments. Under the new arrangement, the United States is divided into three sales areas: an eastern division, under *MELVIN W. PAULY*, sales manager; central division, headed by *HAROLD H. LAYRITZ*, sales manager, and a western division, directed by *CHARLES W. BURRAGE*, sales manager.

M. W. Pauly

H. H. Layritz

ALEXANDER CALDER JR. has been appointed executive vice president and general manager of Union Bag & Paper Corp., New York, N. Y. He formerly was vice president and assistant to the president. *H. S. DANIELS*, who has been a consultant to the Office of Price Stabilization, is to take over the direction of all company sales as executive vice president and general sales manager. *JAMES L. KNIPE* has resigned as vice president and general sales manager, but is to continue his association with the firm as a director.

ERNEST BARKER has joined the laboratory staff of Oxford Miami Paper Co. He was formerly with Sorg Paper Co., Middletown, Ohio, and Blake, Moffitt & Towne Co., paper merchants of San Francisco.

Oxford Miami Paper Co. has announced changes in the production control staff. *J. R. CARNEY* has been transferred as supervisor at Oxford Miami to a similar post with Oxford Paper Co., Rumford, Maine. Succeeding Mr. Carney is *J. OZIAS;* and *RICHARD MEYER* has been transferred from the technical department to the production control department.

WILLIAM J. MURRAY JR. has been elected to the board of directors of International Paper Co., New York, N.Y. He succeeds the late Albert H. Wiggin. Mr. Murray is chairman of the board of McKesson & Robbins, Inc., and a director of the Bank of Manhattan Co. and General Foods Corp.

Celanese Corp. of America has announced the election of three vice presidents: *KENNETH G. DONALD, G. W. SEYMOUR, JOHN D. FENNEBRESQUE.*

Cameron Machine Co., Brooklyn, N. Y., has announced the appointment of *LEONARD ROCKSTROM* as vice president in charge of engineering; *ALFRED STIRBA JR.* as vice president in charge of manufacturing, and *EUGENE J. WARD* as vice president in charge of sales.

C. W. Burrage

E. J. Ward

MAGNUS-MADE

FABRICATED SCREEN PLATES

for High Plate Capacity – Long Plate Life

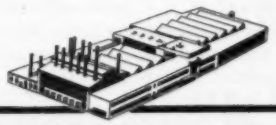
"Hardy" fabricated screen plates, made by Magnus of chrome-nickel-steel or inconel, have a high-strength, thin sheet design that's specially engineered for *maximum flow*. About 40,000 of these plates are now in service, with performance records that prove these three important advantages:

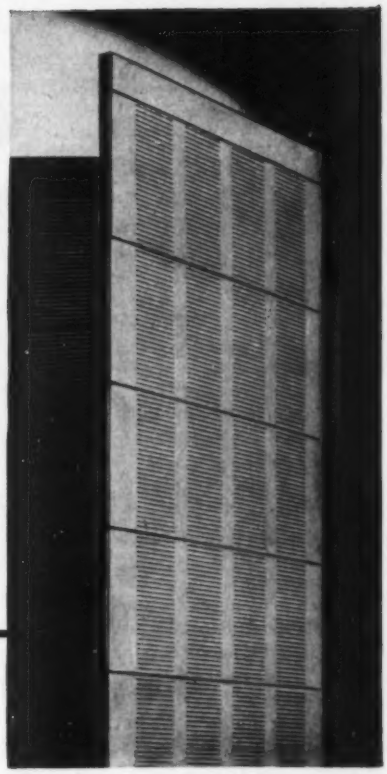
1. **Increased Plate Capacity.** The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. **Longer Life.** Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance, too.

3. **High, Sustained Yield.** Fabricated screen plates assure consistent, uniform quantities of cleaner pulp. This means improved production at reduced operating costs.

Complete information is yours on request. Or if you like, we'll gladly have an engineer call.





MAGNUS METAL CORPORATION, *Fitchburg, Massachusetts*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

The Trade-Mark of

Dependable Felts

The Waterbury Felt Company

SKANEATELES FALLS, N. Y.

"Quality First"

A *Mack* **GRAPPLE**

At work in pulpwood yard. Write for specification sheet and prices

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Photoelectric REFLECTION METER

for accurate measurement of

Brightness and Opacity

of pulp and paper in terms of TAPPI specifications. Also for

Gloss and Color

tests on paper, cardboard and other paper products.

Portable, reliable, rugged, simple to operate

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Also: Colorimeters, pH Meters

The Paper Industry Necrology

Maurice E. Cody

Long active in paper manufacturing and allied fields, *Maurice E. Cody*, 63, vice president and general manager of Black-Clawson Co., Hamilton, Ohio, died December 20. He joined the firm in 1946 as general manager of the Hamilton division and was later elected to the position of vice president.

A native of Fort Wayne, Ind., Mr. Cody began his career with Fort Wayne Corrugated Paper Co., where he advanced to the position of production manager. He then became associated with National Paper Board Co. (now Fibreboard Products, Inc.) at Stockton, Cal.

At one time Mr. Cody operated one of the first mills to make .009 board from chestnut chip. He later was vice president and general manager of Bogalusa Paper Co., Bogalusa, La., then becoming general manager at Union Bag & Paper Corp., Savannah, Ga. During World War II he served for a time as head of the paper section of the War Production Board.

M. E. Cody

J. B. Kindleberger

Joseph B. Kindleberger

Prominent in the paper industry for many years, *Joseph B. Kindleberger*, 45, vice president in charge of consumer and market research for Kalamazoo Vegetable Parchment Co., died suddenly in Kalamazoo January 3. He was a member of the board of directors of KVP and of KVP Co., Ltd., a subsidiary at Espanola, Ont.

The only son of the late Jacob Kindleberger, founder of the firm, he began his career with Hopper Paper Co., Richmond, Va. He was a member and former president of the Kalamazoo Executives Club and was a member of the Kalamazoo Valley Section of TAPPI.

Dr. Ralph E. Montonna

Widely known for research at the University of Minnesota on flax and pulpwood, *Dr. Ralph E. Montonna*, 57, died January 7 in St. Paul. With the exception of a four-year period from 1946 to 1950, when he was director of industrial research at Syracuse University, he had been at Minnesota since 1924.

Dr. Montonna pioneered in the development of a commercially practical method of making linen from Minnesota flax and had worked on the use of aspen for pulp.

Frank J. Heinz, 59, retired Manistique, Mich., lumberman, was killed recently in an automobile accident near Nahma Junction.

Isaak Wittcoff of Elizabeth, N.J., for many years head of Elizabeth Paper Box Mfg. Co., died January 9 at his home. He was 84. Mr. Wittcoff retired in 1936.

Lee Trenholm, 52, public relations and advertising manager of Provincial Paper Ltd. and its parent corporation, Abitibi Power & Paper Co. Ltd., Toronto, died January 9.

Edward Ray Hern, superintendent of the power plant of Westvaco Chemical Div., Charleston, W. Va., died January 13.

Albert S. Harman, 71, president of Pilcher-Hamilton Co., Chicago, died January 7. He had been with the firm 51 years.

W. H. Mapes, founder and former president of Mapes Mfg. Co., Griffith, Ind., died January 10 in Newark, N.J.

Raymond C. Gaugler, 59, president of American Cyanamid Co., died January 11 at his home in Larchmont, N.Y. Before joining Cyanamid, he was with United States Aluminum Co. and Northern Aluminum Co. He joined Cyanamid in 1917, was named treasurer in 1929, vice president in charge of finance in 1939, and executive vice president in 1947. He was elected president in 1951.

Cleveland F. Moulton, 65, co-founder of Roodhouse Envelope Co., Roodhouse, Ill., died December 25. Mr. Moulton founded the firm together with E. H. Todd in 1913. He retired in 1950, remaining with the company only in an advisory capacity.

Morris A. Levy, 100-year-old retired paper bag and twine merchant who was in business in Brooklyn, N.Y., for many years, died January 7. Born in Russia, he emigrated to the United States as a young man and in 1887 became an American citizen.

Albert S. Harman, president of Pilcher-Hamilton Co., which he had served for 51 years, died in Chicago January 7. He was 71.

Millard M. Bosworth, former general manager of the Memphis, Tenn., plant of Bemis Bag Co. and founder and president of M. M. Bosworth Co., died December 18 in Memphis. At the time of his death he was president of the Memphis Memorial Park and vice president of Boz, Inc., towel manufacturing firm. He joined Bemis in 1897 as an office clerk. He was made manager of the Memphis plant in 1915. At that time he founded his own bag firm, which was sold in 1950 to Werthen Bag Corp. Mr. Bosworth had been a member of the Memphis Merchants Exchange 51 years.

Harry P. Banks, former western division manager and a vice president of Monsanto Corp., died December 26 in Phoenix, Ariz.

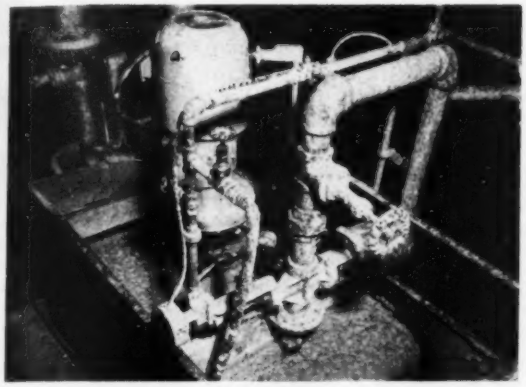
Thomas Jefferson Klase, a retired traffic department executive with International Paper Co., New York, N.Y., died at his home December 20.

Miss M. Merthy Dean, a member of the school committee and personnel manager of American Writing Paper Mills, died in Holyoke, Mass., December 26.

Otto W. Mielke, 80, ex-president of the Portland, Ore., Chamber of Commerce and president and general manager of Blake, Moffit & Towne Co., a wholesale paper firm, died December 24 in San Francisco. He joined the paper company, then known as Blake, McFall & Co., in 1899.

A. W. Pohlman, founder and president of A. W. Pohlman Paper Co., Inc., New York, N. Y., died January 1 at his home in Maplewood, N. J. Mr. Pohlman founded the business in 1919. He had been active in the National Paper Trade Association.

Louis Brenner, 61, founder of Brenner Paper Products Co., Long Island City, N. Y., died December 17. He had been with the firm since 1923.



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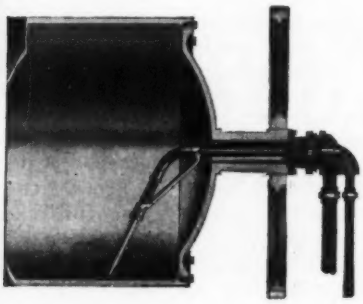

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With the passage of the years, and with millions of "K" Fittings proving their worth in actual service, "K" has become a symbol of quality. That long and commendable background, therefore, imposes upon us the obligation to maintain that high quality standard.

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3,000 Shapes and Sizes

The Paper Industry Safety News

RECOGNITION of an exceptional record in safety is accepted by Border Publishing Co. H. H. Berg (left), shop superintendent, receives a plaque from E. L. Eisenach, sales engineer for Employers Mutual. Looking on are Paul A. Anderson (next to Mr. Berg) and R. W. Croucher, Mando safety officer

MANDO Subsidiary Claims Safety Record

Border Publishing Co., a subsidiary of Minnesota & Ontario Paper Co., International Falls, Minn., recently received recognition for its work in accident prevention. The firm was presented an engraved plaque by Employer's Mutual Liability Insurance Co., Wausau, Wis., for its low frequency rate achievement.

Officials of Border Publishing believe that the total of 2,000 accident-free days as of January 19 for its 35-man printing and editorial staff has established some sort of record. The firm hasn't had a lost-time accident for nearly six years.

The last mishap resulting in lost time occurred August 2, 1946, when a carrier boy was slightly injured while on his route. According to Paul Anderson, editor and publisher of the *International Falls Daily Journal*, there have been no compensable lost-time accidents within the printing plant itself since 1934. The daily is published by Border.

According to R. W. Croucher, safety officer for Mando and its subsidiaries, Border's perfect safety record since 1946 is unequalled by any other Mando department. He commended H. H. Berg, mechanical superintendent, and the members of his department for their record.

Safety Discussed at Tacoma Labor-Management Conference

Union and employer representatives of the pulp and paper industry of the State of Washington met January 24 and 25 at the Winthrop Hotel in Tacoma for their sixth annual safety conference. The meeting is jointly sponsored by the industry and the unions representing workers in more than 20 mills in the state. More than 200 were expected to attend.

The program of joint safety conferences was inaugurated in 1946 by the Pacific Coast Association of Pulp and Paper Manufacturers, representing the employers, the International Brotherhood of Pulp, Sulphite and Paper Mill Workers (AFL) and the International Brotherhood of Paper Makers (AFL), representing the employees, in an effort to improve the accident experience in the 35 Association member mills in Oregon, Washington, and California. Since then, conferences have been held annually in each of the three states to stimulate and maintain interest in safety and to keep all concerned abreast of new developments in the field of accident prevention.

Both management and labor officials say the conference program has been an important factor in the 70 per cent decrease in work accidents that has taken place in Pacific Coast mills since 1946. Washington mills have an accident frequency of 8.5 disabling accidents per million man-hours worked, as against 11.8 in the industry on a nationwide scale.

During the meeting the Governor's trophy was to be awarded to the pulp or paper mill having the best safety record for the year. Established three years ago by Gov. Arthur B. Langlie, the perpetual trophy has been won in past years by Longview Fibre Co., Longview, Wash., and by California Container Corp., Tacoma.

The two-day program was to include discussions on such subjects as "Human Relations in Safety and Supervision," "Safety in the Home," "Safety Indoctrination," "Workmen's Compensation," and "An Executive's Viewpoint of Safety."

General chairman of the program was to be B. K. Wickwire of Longview Fibre Co. Other officials: presiding co-chairmen, John Sherman, vice president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, and S. W. Grimes, secretary of the Pacific Coast Association of Pulp and Paper Manufacturers.

International Division Summarizes '51 Record

During 1951 there was a total of 87 lost-time injuries reported by the mills of the Northern Division of International Paper Co. This compares with 72 in 1950. The combined frequency rate is 8.03, and the severity rate is 1.63. Both rates are 11 per cent higher than in 1950. Company safety officials have declared that the increase is partly accountable to increased activity in the mills, as shown by the fact that there were nearly 1,000,000 more man-hours worked than in the previous year. In addition, there was a substantial increase in labor turnover.

According to an announcement by the firm, the frequency rate is comparatively better than the 9.81 reported for the Paper Section of the National Safety Council for January through November, and it is much better than the rate reported by the Bureau of Labor Statistics covering about 475 pulp and paper mills, which at this time is anticipated to be approximately 15.5 for the year 1951.

There was one fatal injury. The 6,000 penalty days charged account for about one-third of the total time charges.

Both the Otis and Ticonderoga mills improved both their frequency and severity rates. The severity rate at the York Haven mill was reduced from 0.23 in 1950 to 0.14 during 1951. Niagara was the only mill with a frequency rate in excess of 10.

The Groundwood Department had eight less lost-time injuries than in 1950. Other reductions in the number of lost-time injuries were: repairs, 6; power plant (steam), 3, and paper machines, 2.

Safety officials called the records of the finishing and paper handling departments disappointing. The number of lost-time injuries increased from six in 1950 to 16 during 1951. Other trouble spots for the year were wood handling, beaters, and indoor miscellaneous, as the number of lost-time injuries in each of these departments increased by five over the previous year. Technical control had four lost-time injuries in 1951, against none in 1950.

What's corn doing "deep in the heart of Texas"?

Research discovered that drilling for oil could be expedited by the use of a binding agent made of a product of corn. This firmed up the side walls . . . also aided in the early flow of sludge. "Black gold" speeded by yellow corn! This is but one of the numerous examples of how continuous basic research in corn helps American industry . . . helps you.

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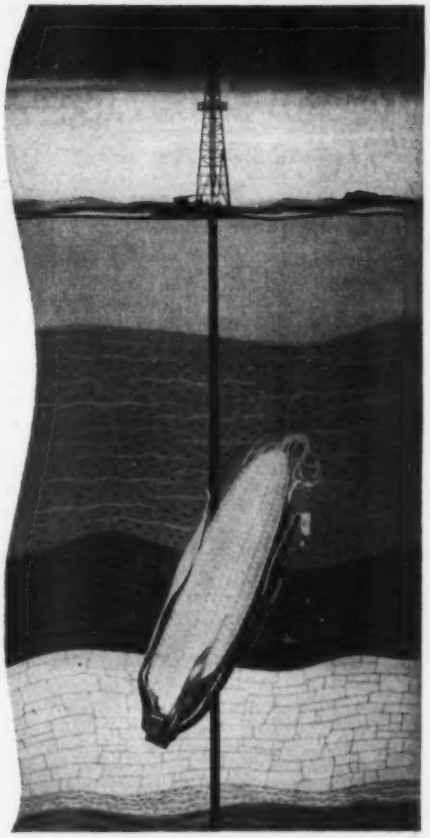

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MANUFACTURERS OF TISSUE and TOILET PAPER
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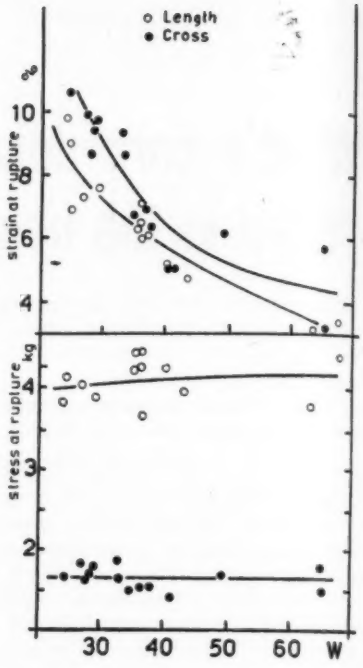
Foreign Abstracts . . . . . .

Effects of draws and felt tension on paper properties

This is an extensive contribution from the laboratory of the Swedish Paper Industry. The experimental paper machine used in this was fully described by Brauns *(Svensk Papperstidn,* 49, 215 (1946). Unbleached sulphite pulp was used and beaten to 40 deg. S.-R. The stock was treated with 1.5 per cent Bewoid size and 2 per cent alum. In each individual run, the machine was kept constant, but different speeds were used in various experiments (between 50 and 70 meters/sec.). In all cases, the finished sheet weighed 60g./sq. meter. Operating conditions (e.g., draws, felt tension, or drying) promoted changes in the sheet during machine runs.

If a sample of the running sheet is removed at a certain point in the machine, and again at another point, and left to dry freely in air under identical conditions, then differences in paper properties must be attributed to the mechanical functioning of the machine between the two points of sampling. When the continuity of operation was satisfactory, the paper was marked with a dye by means of cogwheels such as that shown in Fig. 1; and, simultaneously, moisture samples were taken, and slips were inserted into the reel with codes for each such marking. The samples were taken at the center of the web without completely breaking the paper. When the marking was complete (i.e., within about 10 min.), the web was broken at desired points. A sample across the width of the machine was taken and left lying flat. Each time, the web was immediately carried forward again, all the way to the reel, and the next sample (at some other point along the dryers) was removed only when the machine was again under control. Actual tensions in felts and sheet were not measured.

Samples for determining dimensional changes were cut from the reel when the run was complete, stored at 65 per cent relative humidity and 20 deg. Shrinkage in the cross-machine direction was measured at the difference in distance between the parallel lines marked by the cogwheels. Shrinkage in length could be calculated by counting the number of cog prints per unit length. Samples were tested in an automatic stress-strain recorder, and the results recorded as work of deformation to an elongation of 2 per cent, thus characterizing the mechan-



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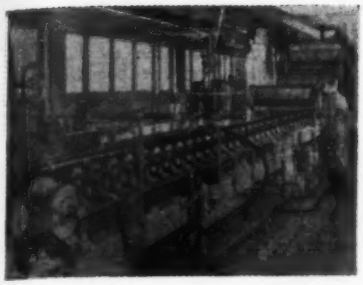


ical properties of the paper.

It was found that stress-strain properties depend on dimensional changes in the web. When shrinkage is prevented, by using tight draws and felts, a mechanical condition results in the direction of the tension, leading to decreased extensibility of the finished sheet. Ordinarily, the greatest decrease in extensibility occurred after the web had reached "75 per cent dryness."

The correlations between dryness, shrinkage, and mechanical properties are fully discussed and shown by means of tabulated data and 12 diagrams. Fig. 2 (an example of such graphs) shows the correlation between work of deformation and strain, or stress, at rupture. Fig. 3 shows the wet end of the experimental machine during a run. Twenty-nine references are given. A. P. Arlov and B. Ivarsson. *Svensk Papperstidn.* 54, No. 21, 729-738 (1951). (In English).

British National Packaging Exhibition

The second National Packaging Exhibition was held at Olympia from January 30 to February 9, 1951, showing the mechanization of packaging in Great Britain and demonstrating modern British, American and Continental equipment. Ice cream cup-making machinery, a carton, film-wrapping machine, a polyethene bag-making machine and others were shown. The exhibition was opened by the president of the Board of Trade and was highlighted by a series of lectures and talks. From *World's Paper Trade Review,* 134, No. 23, 1630 (1950).

Chemical properties of pulp fractions

The investigation was made with unbleached aspen and with both bleached and unbleached spruce sulphite pulps, which had been fractionated with a Clark fiber classifier into 3 fractions, each varying according to fiber length. These fractions were then analyzed chemically and the data compared with those already in the literature. Parenchyma cells of aspen were shown to contain less alpha cellulose and pentosans and more resin, fats, waxes, ash, and lignin than did the other types of cells. Their copper number was higher and their degree of polymerization was lower. The vessels contained slightly less alpha cellulose and pentosans, and somewhat more ether solubles than did the other cell types. Their copper number was also somewhat higher. However, these vessels showed the best reactivity on xanthogenation (whereas parenchyma cells showed the poorest).

In the case of spruce, the parenchyma cells also contain less alpha cellulose and more ether solubles, ash, and lignin than do the tracheids. Their copper number is higher, and their degree of polymerization is lower. Furthermore, they are more difficult to bleach, but their reactivity and pentosan content is approximately the same as those of the tracheids.

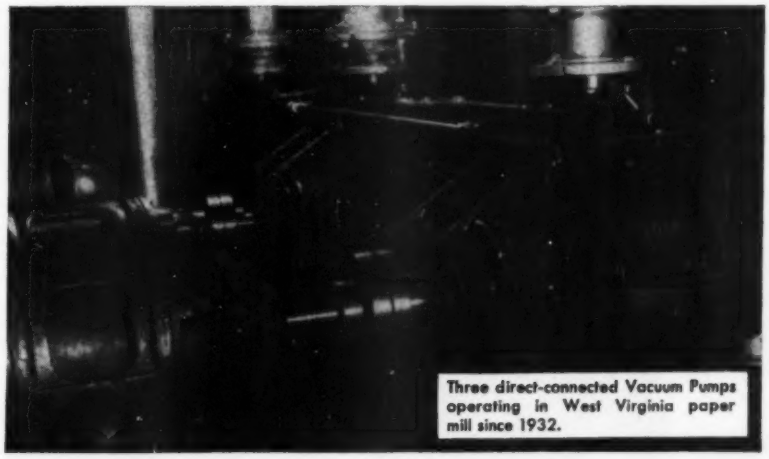
Eleven graphs, one table, and 15 references are given. Olavi Perila and Helmer Roschier. (Contribution from the Institute of Technology, Finland; Helsinki.) *Paper and Timber* (Finland). (Original in Finnish, with English summary.)

Regeneration of lime from waste mud

The author, in a comprehensive article, shows that lime recovery from waste mud may serve to effect a saving of 8-12 rupees per ton of kraft pulp. It is seldom that a mill (in India) is located sufficiently near a limestone quarry, and one which can supply lime of sufficient purity to be of use in caustization.

Sorted lime from a kiln draw usually averages only 68-70 per cent calcium oxide. Hence, waste mud becomes important in lime regeneration, and this has led to the development of rotary kilns for processing this lime for the causticizing cycle. Such mud from the white liquor clarifier is so processed through a multi-deck clarifier and Oliver sludge filters, as to ensure the minimum losses in sodium compounds.

Controlled filtrations yield a wet sludge



Three direct-connected Vacuum Pumps operating in West Virginia paper mill since 1932.

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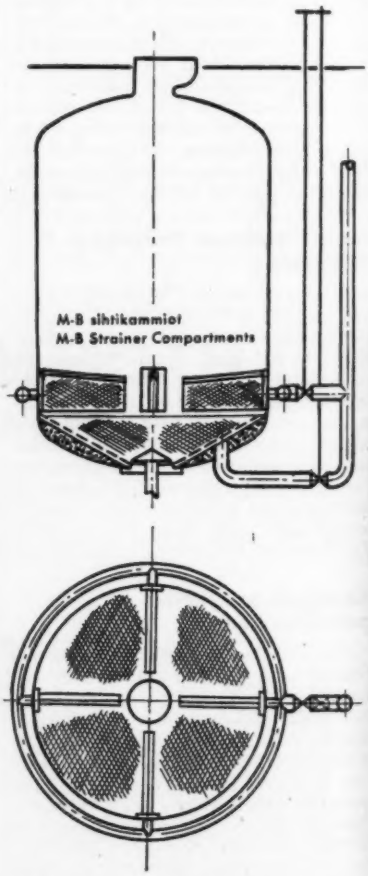
containing about 50 per cent water and (in the analysis given) about 47.3 per cent calcium carbonate. Small amounts of calcium hydroxide are also present, and these are advantageous in subsequent kilning. Other impurities are magnesium carbonate, small amounts of silica, and oxides ("R_2O_3"), as well as sodium compounds. Calculated on the dry basis, sodium oxide should not exceed 0.8 per cent because, when in excess, dirty lime results, loss of lime in flue gases is augmented, and kiln linings may be attacked. For this reason, the lime sludge must be thoroughly washed. Per ton of dry pulp, the yield of dry sludge averages about 380 kilos. "Make-up" limestone must be added in amounts dictated by the composition of the lime produced, and by the losses in the closed circuit operation.

Optimum composition and size of the limestone are discussed. The analysis of a typical *reburnt* sludge is given. Under controlled conditions, the computed yield of lime to the sludge processed is in the ratio of 1 to 1.88. The author shows schematically the arrangement of a lime sludge reburning unit, which is essentially similar to those used in wet-slurry cement practice.

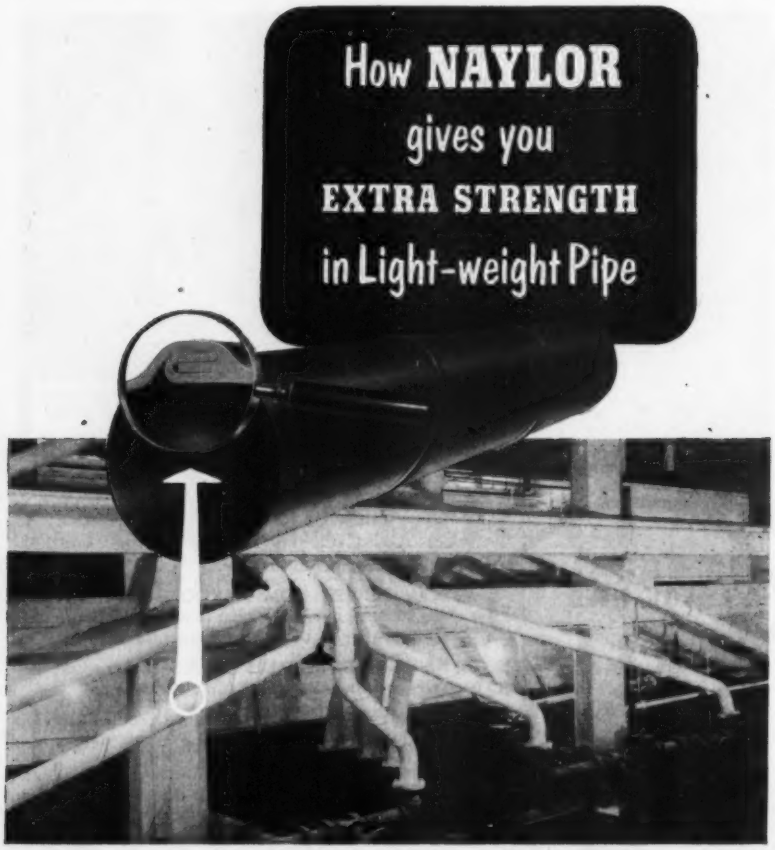
He also discusses at length the producer gas generator used in such a unit, its operating technique and heat balance, and the design of the calciner and cooler and their operation. Fuel rates in relation to the consistency of the kiln feed and the heat balance of the calciner and cooler are described. Graphs show moisture in the kiln feed versus heat units wasted per pound of burnt lime; the weight of wet flue gas per ton of burnt lime plotted against moisture content of the feed sludge; and the relationship between sludge moisture content and gas consumption. Actual kiln and cooler operating data (collected in a Scandinavian mill) are given in a series of tables. S. R. Krishnaswamy. (Orient Paper Mills, Ltd.), *Indian Pulp and Paper*. **5** (Anniversary Number) 26-34 (1951).

New method for washing diffuser pulp

A brief description is given of a new method for pulp washing, using the so-called "M-B" technique. In mill practice, washing time has been reduced by 40-60 per cent when compared with older methods. The degree of dilution of the black liquor is approximately the same as by the older techniques, and pulp quality and



chemical losses are also similar. When the new method is employed, the capacity of old diffuser rooms can be increased greatly, and, in erecting new diffusers, it is possible to effect savings in initial cost. Fig. 1 shows the M-B strainer compartments, and, by means of graphs, the authors demonstrate the great saving in time of washing. A. J. Brax and L. Markila. *Paper and Timber* (Finland). **33**, 284-286 (1951). (Original in Finnish, with English summary.)



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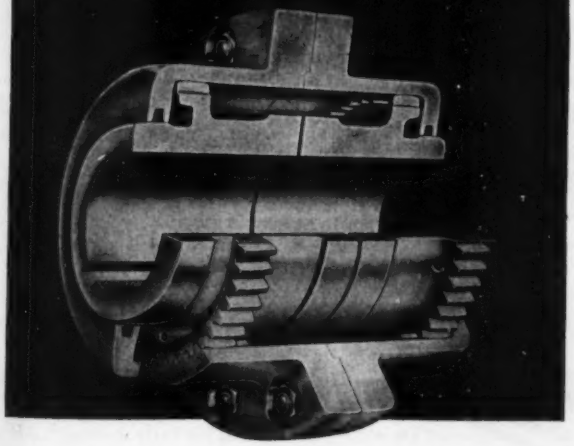

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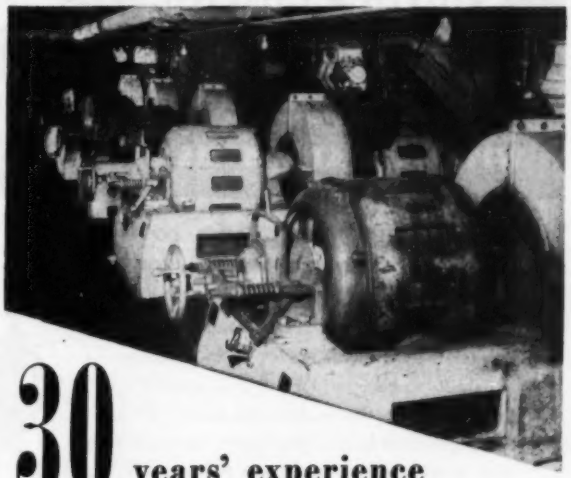

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● In the early 1920's, usage of Bauer Refiners in pulp and paper mills was the original approach to fiber preparation by attrition mill principles.

Down through the years, many new techniques of Bauer fiber processing have been learned in actual mill practice and in laboratory runs on commercial-size disk refiners. Along with these developments, continuous improvements have been made in the machines themselves.

Today, Bauer Disk Refiners are processing almost all conceivable kinds of fibrous materials—hard and soft woods, screen rejects, sheet pulp, rags, roots, straw, waste paper. The end products range from bond papers to wall board and roofing felts.

Whatever your fiber processing or stock preparation problem, chances are that we can refer you to operations where Bauer Refiners are doing similar jobs. If not, we'll be glad to make tests for you in the Fiber Products Laboratory on our premises.

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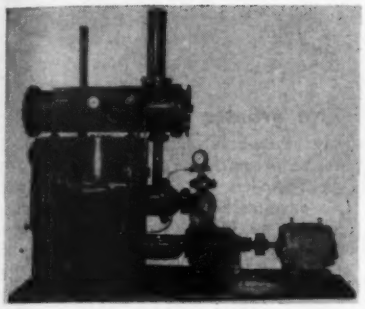

Vacuum pump

A new, improved vacuum pump comes already equipped to permit 25 per cent capacity increase at a fraction of the cost of the original equipment.

Tailor-made to meet individual requirements, this vacuum pump emphasizes accessibility of vital parts, permitting quick, easy inspection and maintenance. Standard horizontal motor and pump are used. The basic unit, equally effective at above or below atmospheric pressures, is designed for vacuums up to 28 in. Duplex units are also available.

Applied to steam processing units, this vacuum pump will rapidly remove air and condensation and return condensate to boiler room at maximum temperature, cutting fuel costs. A built-in heat exchanger eliminates costly cooling equipment. Recirculation or hurling water condenses flash vapors and releases air and gases to the atmosphere. *Stickle Steam Specialties Co., Pump Division, Indianapolis, Ind.*

Potentiometer

A new potentiometer circuit that permits measurements of spans as narrow as 100 microvolts has recently been developed.

According to company engineers, the new narrow span instruments can be used wherever accurate measurements of d-c potentials of the order of microvolts is required, and they are applicable for laboratory investigations and for production line measurements of low potential signals in the order of 0.1 microvolt.

In addition to direct voltage determinations, the instruments are useful (with appropriate primary measuring elements) for the precise measurement of differential temperatures and the determination of slight variations in the temperatures of small objects through the use of radiation pyrometry. Additional applications embracing other variables reducible to d-c potentials also exist where the high resolution obtainable with narrow span instruments facilitates precise measurement. *Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.*

Beta gauges

Two new model Absorption and Backscatter beta gauges for the low-cost determination of the weight per unit area of sheet materials have recently been developed. Based on experience gained from a number of gauges now in successful use in several process industries, the new gauges incorporate improvements making them more suited to industrial use.

A beta gauge, in effect, weighs a small area of the moving sheet by means of a beam of radiation. Absorption beta gauges, basically, determine weight changes in sheet material by means of a small beam of beta rays. Backscatter beta gauges offer advantages for many installations because they are mounted on one side of the sheet only.

Beta gauges are unaffected by speed of the moving web, do not contact the material being gauged, may be installed in any location on the machine, and the meters or recorders may be placed at a distance. *Tracerlab Inc., 130 High St., Boston 10, Mass.*

Liquid stainless steel

A protective coating consisting of actual stainless steel reduced by a new process to a microscopically fine form (flakes) and combined with vinyl plastics to form a quick-drying liquid that will give a surface of actual stainless steel in coating form to protect against rust and corrosion is now available. Thus, metals, wood, composition board, concrete and brick can be given much of the permanence of metal itself.

This liquid stainless steel, which can be sprayed, brushed or dipped, offers impermeability to moisture, of type 18/8 No. 302 stainless steel. Neither the resin binder nor the stainless steel changes appreciably with age. It is tack free in five minutes or less, quick drying and may also be baked. It has been thoroughly tested both in the field and by testing agencies. *Slip-On, Inc., 401 Broadway, New York 13, N.Y.*

Welding coupling

The new scale-free welding coupling now makes it possible to eliminate damaging welding scale from piping systems. It consists of two forged halves. The ends of the hubs are prepared for welding to pipe or welding fittings of corresponding sizes. When the two halves of the coupling are brought together, the tongue of one slips into the groove of the other. A circumfer-

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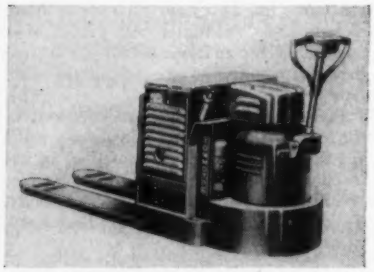
ential cavity directly beneath the beveled welding area prevents burn-through or the formation of icicles in the interior. The cavity also insulates the interior from the extreme welding heat and prevents scaling.

The coupling is useful in connecting piping designed to carry hydraulic fluids, high pressure steam, compressed air, certain chemicals and gases, lubricating oil, and fuel oil. *Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.*



Electric pallet truck

A built-in gasoline-powered generator has been developed for use with Towmotor electric pallet trucks, eliminating the need for conventional electric storage batteries and recharging, and providing constantly available power for 'round-the-clock operation.

The new unit is called "Model W with Ready-Power." The Ready-Power mechanism is mounted in the standard battery compartment, with gasoline engine, fuel tank, starting battery and all accessories completely enclosed in the sturdy steel housing. Ample electric power is provided to move up to 4000 lb. loads 24 hours a day. *Towmotor Corp., Cleveland, Ohio.*

Bellows connector

Fabricated of chemically inert Teflon, the new "John Crane" bellows-type connector has many pipe line applications where vibration, expansion and electrolysis exist in the handling of corrosive liquids or gases and solvents. The new connector is electrically non-conductive, flexible, and strong.

This bellows connector, which serves as a vibration dampener as well as an expansion joint, connects misaligned couplings and insulates flanges electrically. End flanges of the joint are French-type envelope gaskets made integral with the joint for easy assembly between companion flanges and a tight, leakproof seal on installation. *Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.*

Nickel-free electrode

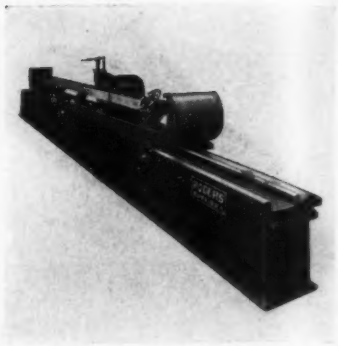
A new nickel-free electrode for cast iron, EutecTrode 27, has recently been announced. While this new rod does not replace nickel-bearing electrodes on all applications, it is said to offer a high-tensile weld with a uniform amount of carbon in the deposit so that the deposited material is similar to a high-tensile, high-carbon steel, thereby increasing the tensile strength of the weld. *Eutectic Welding Alloys Corp., 172nd St. and Northern Blvd., Flushing, N.Y.*

pH Meter

A new battery-operated pH instrument incorporating a number of advancements for convenience and all-around adaptability in plant and field applications has recently been developed. Known as the Model N pH meter, it is light in weight, very compact, and rugged enough to be used anywhere—in the field, in the plant, in shops, mills or laboratories—without dependence upon outside power circuits.

The complete instrument measures 4 in. x 6 in. x 9½ in. overall, including built-in power supply, and weighs less than 8 lb. The electrode support is mounted on the side of the case so that it can be easily rotated to permit the instrument to be used in either a horizontal or vertical position.

Two versions of the Model N are offered. Model N-1 is the basic instrument, and Model N-2 is the deluxe model which includes an auxiliary carrying case that folds up integral with the instrument itself to provide a completely portable unit. *Beckman Instruments, Inc., South Pasadena 73, Calif.*



Knife grinder

An extra-heavy-duty knife grinder of massive proportions, one of a new "220 series" grinders, has recently been produced. This huge machine is designed to precision grind doctor blades, paper knives, heavy-duty chipper knives and shear blades up to 210 inches long. It is also adaptable for flat faces and straight edges. Its cabinet base is 30 ft. long and the whole machine weighs 10½ tons. *Samuel C. Rogers & Co., 183-201 Dutton Ave., Buffalo 11, N.Y.*

Aluminum paint

A new, high-heat, aluminum maintenance paint called Thermalite protects metals subjected to temperatures ranging from 200 to 1000 F. It has proved successful in giving durable protection to boilers, kilns, exhaust stacks, furnaces, melting pots, refinery equipment and laboratory apparatus.

It differs from older types of aluminum maintenance paints in that it contains "silicones," a resin compound created from a complex chemical treatment of quartz-like silica. The "silicones" possess many desirable qualities unobtainable with any or-

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New, improved STICKLE Vacuum Pump

permits 25% capacity increase

• Why put limits on machine capacity—add unnecessary expense to future expansion? Install, in the beginning, the new, improved Stickle Vacuum Pump—already equipped to permit *25% capacity increase*—at a fraction of the cost of the original equipment.

The tailor-made Stickle Vacuum Pump cuts costs all around. Every vital part is easily accessible, permitting quick, easy inspection and maintenance. Built-in heat exchanger eliminates costly cooling equipment. Whether your machines operate at above or below atmospheric pressure, proper drainage is *assured.*

Basic unit, employing standard horizontal motor and pump, is designed for vacuums up to 28"—easily stepped up capacities. Duplex units are also available. PERFORMANCE GUARANTEES PRIOR TO EVERY INSTALLATION. Get all the facts, *free.* Write:

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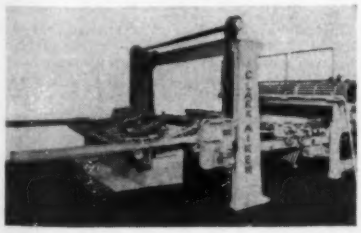
ganic resin used in the manufacture of heat-resisting aluminum paints.

In addition to its main function of preventing the attack of rust and corrosion on hot metal surfaces, Thermalite offers resistance to weather, chemical fumes and salt spray. It does not discolor, blister, flake or burn off in temperatures up to 1000 F. *Tropical Paint & Oil Co., Cleveland, Ohio.*

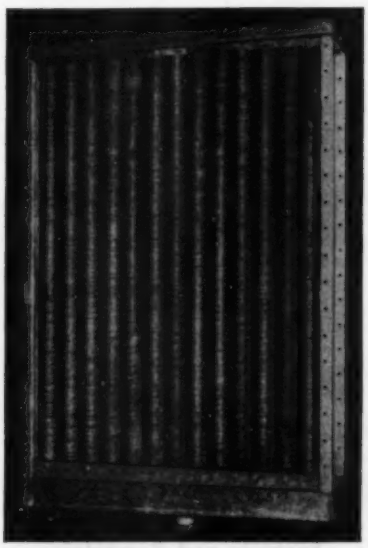


Layboy

Employing an entirely different piling principle, the "Vickery"-type layboy reduces down-time for pile removal to a point where cutter operation is practically continuous. At the same time, it piles to a greater height, reducing the number of shutdowns necessary for removing loaded skids.

The hydraulic system is operated by an independent motor, with heavily-constructed cylinders and pistons and heavy-wall tubing connecting lines. Operation of the hydraulic cylinders is controlled by an electric timer adjustable to any speed of pile height growth.

These layboys are available in a complete size range for use with all late-model Clark-Aiken cutters or can be adapted for use on older model Clark-Aiken sheeters or other makes. *The Clark-Aiken Co., Lee, Mass.*



Heating coil

This heavy-duty heating coil consists of a single header of heavy steel plate, completely welded, which is divided into a steam chamber and a condensate chamber. To the steam chamber are welded standard ⅜-in. pipes which are inside standard 1-in. pipes that are welded to the condensate chamber. The steam flows from the steam chamber through the smaller inside pipes and escapes into the 1-in. pipe where it is reduced to condensate, flowing back through the condensate space to the return line.

Some of the features of this coil are its durability; individual expansion and contraction of each pipe, eliminating possibility of strain on other pipes; galvanized fin and pipe construction, and small possibility of the return header freezing.

This coil is made of standard steel pipe, extra heavy wrought iron pipe, or admiralty metal tubes, all with steel fins. Four widths, three coil depths and fifteen lengths are available. *Industrial Manufacturing & Engineering Co., 3845 Ravenswood Ave., Chicago 13, Ill.*

Suction line strainer

A 1½-in. suction line strainer that will fit a 2-in. tank opening has recently been developed. Used in pump suction lines, it is so designed that the liquid must enter from the sides instead of the bottom. On existing installations where volatile compounds have been used, this strainer, known as the 611C, will eliminate the danger of an explosion set off by sparks caused when chipping out existing bushing. It can also be used in initial installations for any size opening, 2 in. or larger.

The body of the strainer is made of galvanized iron, with 8-mesh screen. It can also be made in other materials, meshes, and sizes. *Universal Valve Co., Elizabeth, N. J.*

The Paper Industry New Literature

Books

BOILER FEED WATER TREATMENT, third edition. By F. J. Matthews. Published by Chemical Publishing Co. Inc., New York, N.Y. 207 pages. 8½x5½. $4.50.

Included in this third revised edition are new plant constructional features and revised material on problems such as caustic embrittlement, carbonate and phosphate conditioning, the mechanism of scale formation, priming and production of wet steam, etc. Additional material concerning silicate scale, hydrogen and demineralizing zeolites, colloidal conditioning, use of metaphosphate, the Budenheim process, electrical scale prevention of turbine deposits and economiser scaling and corrosion has also been included.

Natural waters and their unsuitability for boiler feed are described. Old and new corrective measures for principal operating troubles are discussed. A section on analysis and routine testing is given. Also included is an appendix containing useful tabular data.

THE PROGRESS OF FORESTRY, 1945 to 1950. Published by The American Forestry Association, 919 17th St., N.W., Washington 6, D.C. 90 pages. $3.00.

Compiled by a committee of government, state and private individuals, this report is a documented record of forestry progress in one of the most critical periods in the forestry conservation movement in the United States.

This report, which points out the strong and weak points in the whole forestry conservation movement, presents facts and figures from many sources on such topics as forest damage from fires, insects, and disease; organized forest fire protection; forest land management; forest land taxation; forest legislation; tree planting; forest surveys; research, and education; training of foresters; new technical advances in equipment used in forestry, and recreational use of forests.

TECHNIQUES OF PLANT MAINTENANCE—1951. Published by Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y. 228 pages. 8½ x 11. $6.00.

This new volume is a companion piece to "Teechniques of Plant Maintenance," however, it is printed and bound instead of mimeographed. An extensive discussion of recent developments in problems of plant maintenance, the book contains the proceedings of the Plant Maintenance Conference held in conjunction with the show. One of the features is a series of questions and answers submitted after each of the 12 sessions.

More than forty nationally known experts in the field of maintenance contributed papers. Some of the subjects covered include preventive maintenance, inspection procedures and frequencies, records and reports, training personnel for maintenance, organization and management for maintenance, maintenance costs, incentive payment of maintenance workers, etc., in addition to specialized discussions on maintenance of electrical equipment, power plant and heating equipment, problems of the small plant, selections and maintenance of lighting equipment, maintenance in paper and paper products plants and other topics.

WATER TREATMENT FOR INDUSTRIAL AND OTHER USES. By Eskel Nordell. Published by Reinhold Publishing Corp., New York 18, N. Y. 525 pages. $10.00.

Industrial uses of purified water are exhaustively covered in this book. Its subject matter deals with water supply impurities such as chemical compounds, suspended solids, color, taste, etc., and the methods of treatment to fit them for a great variety of uses.

The author, who has had 32 years of experience in the water treatment field, discusses water requirements in various industries, and problems relating to chemical reaction and analysis, boiler feeds and cooling water are thoroughly examined.

PIPING DESIGN AND ENGINEERING. Published by Grinnell Company, Inc., Providence, R.I. 223 pages. 8¾ x 11. $10.00.

Engineering data and technical information for the use of engineers engaged in the design and application of pressure piping systems previously available only by consulting a number of sources are now compiled in this one volume, in addition to material which has never been published.

The book is divided into sections on expansion and stresses, velocity and pressure drop, heat transfer, allowable "S" values, pressure-temperature pipe graphs, metallurgical briefs, piping materials, pipe fabrication, pipe hangers and supports, and general tables. Code requirements and a bibliography are also included.

Booklets and Pamphlets

FOREST STATISTICS FOR SOUTHWEST OREGON UNIT. Forest Survey Report No. 104. By F. L. Moravets. Published by Forest Service, U.S. Department of Agriculture, Pacific Northwest Forest and Range Experiment Station, Portland, Ore. 36 pages. 10½x8. This publication summarizes in statistical form the results of a reinventory of the forests of the Southwest Oregon Unit conducted during the period of 1947-49. Included are numerous graphs, and tables, in addition to an outline map of the Unit showing generalized forest types.

ALLOYS IN COPPERLAND. Published by Copper Alloy Foundry Co., Hillside, N.J. 28 pages. 9½ x 7½. $1.00. Written by George Black, Copper Alloy's public relations director, the book describes for children of all ages a tour through the world of stainless alloys. Illustrated and written primarily for children, the book presents a new approach to industrial advertising.

GAS AND OIL EQUIPMENT LIST. Published by Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 240 pages. 6 x 9.

This booklet is divided into two sections, the first dealing with devices, materials, and systems which have been examined with reference to fire hazards and such accident hazards as are involved in the class under which they are listed. Section II includes products classified as to fire hazard only.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Pumps. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee 1, Wis.—Construction details on grease-lubricated pedestal-mounted general purpose pumps (Type SSB) are given in bulletin 52B6351B, which consists of six pages.

Thickener. The Door Co., Barry Place, Stamford, Conn.—Consisting of 28 pages, Bulletin No. 3001 covers the major types of thickeners with text drawings, photographs and size ranges. Also included are sections on control devices, special designs and the company's engineering service.

Moisture Testing. Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.—This 12-page booklet describes a complete line of Dietert-Detroit moisture tellers. It contains many photographs and tables.

Hardfacing. American Manganese Steel Div., Chicago Heights, Ill.—Bulletin SG, a rod selection guide for hardfacing, breaks down into basic operations, the parts that can and should be hardfaced for longer life. It gives the name of the part, the recommended rod, sizes, and method of application. The guide also contains a description of the rods in the Amsco line.

Copper Base Alloys. Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.—This 4-page folder lists 65 commonly used Bridgeport brass and copper alloys, along with their composition, properties, forms, and typical

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uses. The publication is designed to help the metal working industry and other fields to distinguish between copper base alloys.

Potentiometers. Minneapolis - Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44, Pa.—Sixteen-page bulletin B15-13 discusses the characteristics of the measuring circuits used in the Brown ElectroniK Potentiometer. The booklet is specifically for those who wish to apply and utilize this instrument to unique or specialized measurements frequently encountered in scientific or technical investigations.

Pumps. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee—Construction features of the oil-lubricated bearing, pedestal-mounted pump for handling chemicals, liquors, corrosive materials and solutions, hot liquids, and petroleum are described in this 6-page bulletin (52B7638). Complete specifications are given.

Alkalies. Allied Chemical & Dye Corp., Solvay Sales Div., 40 Rector St., New York, N.Y. —This new 72-page edition of Bulletin No. 9 ("The Analysis of Alkalies") includes tables, charts, and indexes, in addition to the recalculation of analytical factors to the basis of the 1948 International Atomic Weights, a colorimetric test for iron and copper, and a temperature correction table for volumetric solutions.

Laboratory Appliances. Fisher Scientific Co., 7722 Woodbury Dr., Silver Spring, Md.—This 16-page booklet describes the facilities of the firm's new Washington, D.C., plant.

Boiler Blow-off Valves. Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, Pa.—Bulletin B-425 replaces the corresponding publication of two years ago. The 24-page booklet gives up-to-date information for valves built for pressures up to 400 lbs. and supplements Bulletin B-433 on high-pressure blow-off valves.

Metallizing Guns. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N.Y.—Bulletins 94 and 95 (each four pages) give information on and descriptions of the firm's newest metallizing guns for corrosion protection.

Fork Lift Trucks. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio—A summary booklet, "What Makes It Tick . . . Or the Inside Story of Towmotor," is being distributed to viewers of the firm's new film, designed to provide essential information to industry on the planning, designing and engineering incorporated in the building of fork lift trucks.

Air-Operated Diaphragm Motor Valves. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—Specification sheet 408-2 covers series 700Lf valves, specifically designed for use in pilot plants and other applications where low flows are encountered.

Corrosion Data. Carpenter Steel Co., Alloy Tube Div., Union, N.J.—This wall chart, just released by Carpenter, gives corrosion resistance information for several analyses of stainless steel tubing and pipe. Corrodants ranging in severity from fresh water and blood to sulphuric and hydrochloric acids are listed, with recommended alloys for use with each. Also given are data on standard tubing sizes, dimensions, pressures and tolerances for stainless pipe in schedules 5, 10 and 40.

Induction Frequency Converters. General Electric Co., Schenectady 5, N.Y.—Designated as publication GEA-5637, this 4-page booklet covers three-phase equipment in ratings from ¾ to 100 kw. It describes the fundamentals, operation, and construction features of the high-frequency power supply apparatus. Complete tables of ratings and frame sizes are included.

Liquid Level Controllers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—Specification sheet 412-2 covers internal float and external float cage liquid level controllers used to maintain liquid level in surge tanks, stills, towers, feedwater heaters, etc.

Throttling Control Service. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa. — This 8-page illustrated bulletin fully describes the Cono Rotomotor, a completely pneumatic gear-driven operator for throttling control service. Applicable to heavy-duty service. Bulletin C-1 contains complete engineering data, dimensions, methods of operation, and various applications.

Fusion Welding. International Nickel Co., Inc., 67 Wall St., New York 5, N.Y.—This 44-page booklet on the fusion welding of nickel and high nickel alloys contains more than 30 tables and about 50 drawings and photographic illustrations. Covered are the various forms of electric arc welding and gas welding. Included in Bulletin T-2 is the boiler code of the American Society of Mechanical Engineers.

Vacuum Breakers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—Specification sheet 413-1 fully describes Honeywell vacuum breakers, giving data as to sizes, construction, operating pressure, and relief capacity.

Power Industrial Trucks. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3—This new, 12-page general catalogue covers high lift and low lift platform trucks, fork trucks, and mobile cranes. Listed are capacities, dimensional specifications, and construction features.

Testing Machines. Testing Machines, Inc., 123 W. 64th St., New York 23, N.Y.—Catalogue 12 embraces equipment used in testing factors in paper, textiles, metals, plastics, rubbers, and laboratory instruments.

Air-Operated Diaphragm Motor Valves. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—The Honeywell Series 100 valve is fully described and illustrated in Specification Sheet 419-1. Included is data such as size, construction, body pressure range, connections, and complete mounting dimensions.

Nickel Alloy Cast Irons. International Nickel Co., 67 Wall St., New York 5, N.Y.—"Engineering Properties and Applications of Ni-Resist" is a 36-page bulletin describing eight types of austenitic nickel alloy cast irons that offer unique combinations of properties. Applications and comparative service data in many industrial fields are presented to prove its utility in withstanding corrosion, heat, wear, and low temperature.

Combustible Gas Analyzer System. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44, Pa.—Instrumentation Data Sheet 10.15-4a describes a new thermocouple-type analyzer which uses Brown ElectroniK Potentiometers for combustible gas analysis. Fully described are the operation, application, and design features.

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Electric Trucks. Raymond Corp., 8780 Madison St., Greene, N.Y.—Bulletin 701 shows the firm's complete line of electric trucks. All specifications for each truck type are clearly listed and the outstanding features described.

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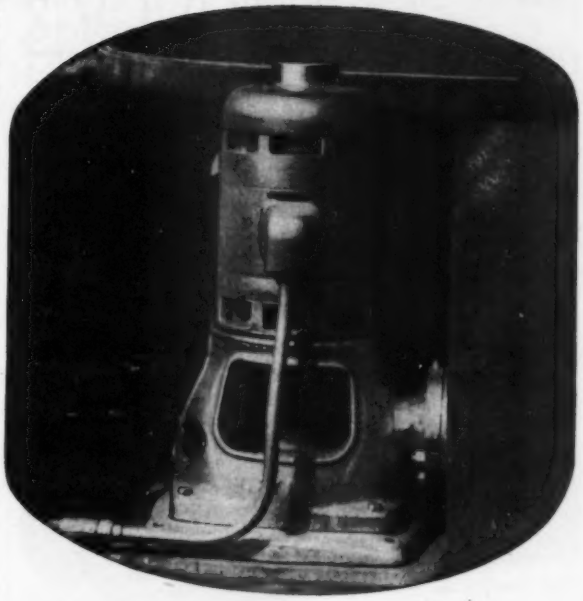

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uses. The publication is designed to help the metal working industry and other fields to distinguish between copper base alloys.

Potentiometers. Minneapolis - Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44, Pa.—Sixteen-page bulletin B15-13 discusses the characteristics of the measuring circuits used in the Brown ElectroniK Potentiometer. The booklet is specifically for those who wish to apply and utilize this instrument to unique or specialized measurements frequently encountered in scientific or technical investigations.

Pumps. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee—Construction features of the oil-lubricated bearing, pedestal-mounted pump for handling chemicals, liquors, corrosive materials and solutions, hot liquids, and petroleum are described in this 6-page bulletin (52B7638). Complete specifications are given.

Alkalies. Allied Chemical & Dye Corp., Solvay Sales Div., 40 Rector St., New York, N.Y. —This new 72-page edition of Bulletin No. 9 ("The Analysis of Alkalies") includes tables, charts, and indexes, in addition to the recalculation of analytical factors to the basis of the 1948 International Atomic Weights, a colorimetric test for iron and copper, and a temperature correction table for volumetric solutions.

Laboratory Appliances. Fisher Scientific Co., 7722 Woodbury Dr., Silver Spring, Md.— This 16-page booklet describes the facilities of the firm's new Washington, D.C., plant.

Boiler Blow-off Valves. Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, Pa.—Bulletin B-425 replaces the corresponding publication of two years ago. The 24-page booklet gives up-to-date information for valves built for pressures up to 400 lbs. and supplements Bulletin B-433 on high-pressure blow-off valves.

Metallizing Guns. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N.Y.—Bulletins 94 and 95 (each four pages) give information on and descriptions of the firm's newest metallizing guns for corrosion protection.

Fork Lift Trucks. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio—A summary booklet, "What Makes It Tick . . . Or the Inside Story of Towmotor," is being distributed to viewers of the firm's new film, designed to provide essential information to industry on the planning, designing and engineering incorporated in the building of fork lift trucks.

Air-Operated Diaphragm Motor Valves. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—Specification sheet 408-2 covers series 700Lf valves, specifically designed for use in pilot plants and other applications where low flows are encountered.

Corrosion Data. Carpenter Steel Co., Alloy Tube Div., Union, N.J.—This wall chart, just released by Carpenter, gives corrosion resistance information for several analyses of stainless steel tubing and pipe. Corrodants ranging in severity from fresh water and blood to sulphuric and hydrochloric acids are listed, with recommended alloys for use with each. Also given are data on standard tubing sizes, dimensions, pressures and tolerances for stainless pipe in schedules 5, 10 and 40.

Induction Frequency Converters. General Electric Co., Schenectady 5, N.Y.—Designated as publication GEA-5637, this 4-page booklet covers three-phase equipment in ratings from ¾ to 100 kw. It describes the fundamentals, operation, and construction features of the high-frequency power supply apparatus. Complete tables of ratings and frame sizes are included.

Liquid Level Controllers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—Specification sheet 412-2 covers internal float and external float cage liquid level controllers used to maintain liquid level in surge tanks, stills, towers, feedwater heaters, etc.

Throttling Control Service. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa. — This 8-page illustrated bulletin fully describes the Cono Rotomotor, a completely pneumatic gear-driven operator for throttling control service. Applicable to heavy-duty service. Bulletin C-1 contains complete engineering data, dimensions, methods of operation, and various applications.

Fusion Welding. International Nickel Co., Inc., 67 Wall St., New York 5, N.Y.—This 44-page booklet on the fusion welding of nickel and high nickel alloys contains more than 30 tables and about 50 drawings and photographic illustrations. Covered are the various forms of electric arc welding and gas welding. Included in Bulletin T-2 is the boiler code of the American Society of Mechanical Engineers.

Vacuum Breakers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44— Specification sheet 413-1 fully describes Honeywell vacuum breakers, giving data as to sizes, construction, operating pressure, and relief capacity.

Power Industrial Trucks. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3— This new, 12-page general catalogue covers high lift and low lift platform trucks, fork trucks, and mobile cranes. Listed are capacities, dimensional specifications, and construction features.

Testing Machines. Testing Machines, Inc., 123 W. 64th St., New York 23, N.Y.—Catalogue 12 embraces equipment used in testing factors in paper, textiles, metals, plastics, rubbers, and laboratory instruments.

Air-Operated Diaphragm Motor Valves. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44—The Honeywell Series 100 valve is fully described and illustrated in Specification Sheet 419-1. Included is data such as size, construction, body pressure range, connections, and complete mounting dimensions.

Nickel Alloy Cast Irons. International Nickel Co., 67 Wall St., New York 5, N.Y.— "Engineering Properties and Applications of Ni-Resist" is a 36-page bulletin describing eight types of austenitic nickel alloy cast irons that offer unique combinations of properties. Applications and comparative service data in many industrial fields are presented to prove its utility in withstanding corrosion, heat, wear, and low temperature.

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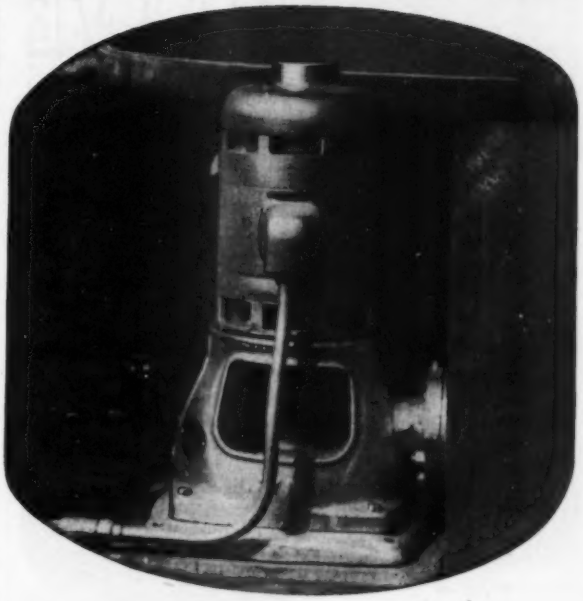

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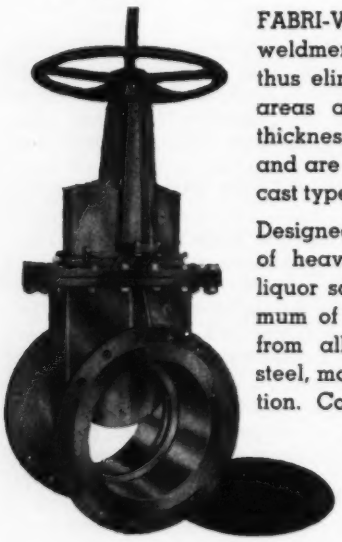

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Corduroy	8.00
Washables, No. 1	6.50
Percales	12.50
Light Prints, No. 1	11.50
Khaki Cuttings—	
Sun Tan	11.50
Mixed	8.00
New White Canvas	19.00
Canton Flannels, bleached	21.00
Canton Flannels, unbleached	21.00
Shirt Cuttings—	
New White No. 1	21.00
Silesias No. 1	16.00
New Unbleached	21.00
Fancy	10.00
Linen Cuttings—	
American	14.50
White	21.00
Grey	21.00

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OLD RAGS

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	per cwt.
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No. 1	1.60 to 1.70
No. 2	1.10 to 1.20
No. 3 and 4	.95 to 1.05
Twos and Blues—	
Repacked	4.75 to 5.00
Thirds and Blues—	
Repacked	4.25 to 4.50
Miscellaneous	3.75 to 4.00
Whites, No. 1—	
Repacked	8.00 to 8.50
Miscellaneous	6.50 to 7.00
White, No. 2—	
Repacked	5.50 to 6.00
Miscellaneous	5.00 to 5.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

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f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
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Wool Tares—	
Light	8.50 to 9.00
Heavy	9.00 to 9.50
No. 1 Scrap Bagging	6.00 to 6.50
Manila Rope—	
No. 1 large	10.00 to 10.50
No. 1 small	9.00 to 9.50
Sisal Rope—	
No. 1 large	8.50 to 9.00
No. 1 small	8.00 to 8.50
New Burlap Cuttings	8.00 to 8.50
Jute Threads—	
Foreign (Nom.)	8.00 to 8.50
Domestic	8.00 to 8.50
Strings—	
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No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	4.00 to 4.25

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Soft White, one-cut	120.00—
Soft White, Misc.	85.00—
Fly Leaf, No. 1	45.00—
Fly Leaf, Woody No. 1	40.00—
No. 2 Mixed Col. Woody	35.00—
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	40.00—
Mixed Books	26.00—
Ledger Stock—	
No. 1 White	100.00—
No. 1 Mixed (Colored)	70.00—
Manilas—	
New Env. Cuttings	110.00—
New Env. Cuts, One-Cut	—
Extra Manilas	60.00—
Manila Tab Cards, Free of Ground Wood	110.00—
Colored Tab Cards	85.00—
Kraft—	
New Envelope Cuttings	110.00—
Tripled Sorted No. 1 100%	55.00—
No. 1 Old Assorted	35.00—
News—	
White Blank	70.00—
Overissue	18.00—
No. 1 Folded	13.00—
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New Jute Corrugated Cuts	24.00—
Mill Wrappers	12.00—
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Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	33.00 to 34.00
Argentine, lb.	33.50 to 34.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.70—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	54.25 to 54.75
Litharge, powd. bbl. lb.	20.50 to 21.00

Rosin (Gum)—	New York, per 100 lbs.
E	8.80—
F	8.80—
G	8.80—
WW	9.80—
Rosin (Wood), carlots,	
F.O.B. South	5.50 to 5.75

MARKET QUOTATIONS

Salt Cake—
Dom. bulk (wks) ton..... 17.00 to 23.00
Imp. bulks on dock—
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Paper bags, cwt..... 1.60—

Soda (Caustic)—
Solid drums, cwt..... 3.35 to 3.40
Ground and flake, drums, cwt. ..... 3.75 to 3.85

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt. ..... 1.70 to 1.80
40 deg. 35 gal. drums, (works), cwt. ..... 1.40 to 1.50

Starch—
Pearl, 140 lb. bags, cwt. 6.44—
Pearl, barrels, cwt..... 6.44—
Paper (Sp.) bags, cwt... 6.44—
Powdered, barrels, cwt... 6.65—

Sulphur (Crude)
(Mine) bulk, long ton.... 21.00 to 22.00

Talc—
Dom. 100 lb. bags (mine) ton ..... 25.00 to 28.00
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
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Calcium Pig. bbls., lb..... .21 to .21½
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The following are OPS ceiling prices on domestic wood pulp, dollars per short air dry ton delivered consuming mills including the basic maximum freight allowances as provided:

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Bleached sulphate .....145.00—
Semi-bleached sulphate .....140.00—
Unbleached sulphate 132.50
Bleached soda .....140.00—
Ground wood ..... 92.50—
Sulphite screenings ..... 72.50—
Sulphate screenings ..... 67.50—
Ground wood screenings..... 60.00—
Unbleached sulphate siderums .....132.50—
Standard news print siderun ..... 92.50—

OPS ceiling prices on European wood pulp, dollars per short air dry ton, on dock at American Atlantic ports, follow:

Bleached sulphite .....225.00—
Bleached sulphate .....230.00—
Unbleached sulphite .....200.00—
Unbleached sulphate .....200.00—

PAPER

Boards—
OPS ceiling prices (CPR 108) per ton, delivered consumer's mill, 10 tons or more:
Plain chip.....105.00—
News vat lined chip.....107.50—
Filled news.....110.00—
Solid news.....112.50—
White vat lined chip.....142.50—
Chip tube and can stock....110.00—
Single manila lined chip....147.50—
Single jute lined chip.....145.00—
White patent coated:
.020 .....175.00—
.018 .....177.50—
.016 .....180.00—

Book Paper—
OPS ceiling prices (CPR 106) per cwt.:

Coated two sides
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides.... 4 cases $17.25 Carloads $16.30
45 lb. enamel, 25x38-500, trimmed 4 sides..... 4 cases $13.05 Carloads $12.10

Uncoated
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides..... 4 cases $14.80 Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed ..... 4 cases $14.05 Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed ..... Carloads $12.40
16 lb. tablet, 17x22-500 ..... Carloads $11.35

Rag Content Bond—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Extra 100% rag	57.50	58.50
100% rag	49.50	50.50
75% rag	38.00	39.00
50% rag	29.50	30.50
25% rag	24.00	25.00

Rag Content Ledger—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

Extra 100% rag	58.50
100% rag	50.50
85% rag	42.00
75% rag	39.50
50% rag	30.50
25% rag	25.00

Sulphite Bond—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Air dry bond (Watermarked)	20.00	21.00
No. 1 bond (M.F. watermarked)	15.50	16.20
No. 2 bond (M.F. watermarked)	14.90	15.60
Plain bond (M.F. unwatermarked)	14.00	14.60

Sulphite Ledger—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:
No. 1, M.F. watermarked..... 16.50
No. 2, M.F. watermarked..... 15.90
Plain, M.F. unwatermarked..... 15.00

Glassine (f.o.b. mill)—
OPS base ceilings (CPR 76): per cwt.
25 lb. base No. 1 bleached glassine ..... 22.50—
25 lb. base No. 1 bleached greaseproof ..... 20.00—

News— per ton
Rolls, Standard (Contract) .....114.00 to 116.00
Rolls (Spot)..... (Nominal)
Sheets .....130.00—

Tissues (Carlots)— per ream
White No. 1..... 2.25—
White No. 2..... 1.75—
Bleached Anti-Tarnish.... —
Colored ..... 2.20—
Anti-Tarnish Kraft ..... 2.10—
Manila ..... 2.20—
Napkins, semi-crepe (12½ lb. to M shts.) per cs..... .90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs..... .90—
Toilet, Bleached (M shts.) per cs..... 9.85—
Toilet, Unbleached (M shts.) per cs..... 6.60—

Towels per case
Bleached ..... 6.80—
Unbleached ..... 5.80—

Wrappings (Kraft)—
OPS ceilings, per cwt., 50 lb. base weight: per cwt.
Standard wrapping ..... 7.75—
Butchers, counter rolls..... 8.25—
Standard bag, mill rolls.... 7.50—
Shipping sack, mill rolls.... 7.75—
Gumming, mill rolls..... 8.00—
Asphalting, mill rolls..... 7.75—
Envelope, mill rolls..... 9.25—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

Bleached Papers— per cwt.
M.F. & M.G. Waxing, 20 lb. (carloads only) —
(10,000 lb.) —
Drug wrapp., 35 lb... —

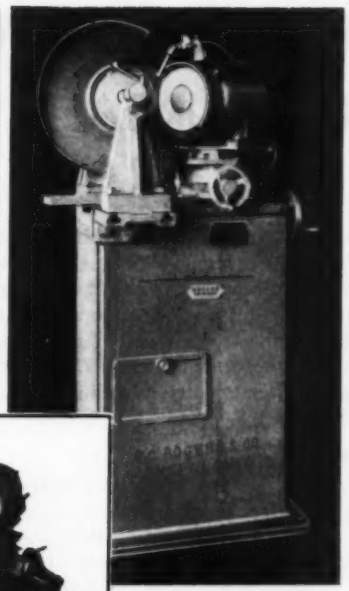
Unbleached Papers
Com. Gr. Butch. 40 lb. —
No. 1 Butchers..... —
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb..... —
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb..... —
Steam Finish, 50 lb... —
Water Finish, 50 lb... —

Manilas—
Envp. Mla., Sub. 16-40 (No. 1)..... —
Env. Mla., Sub. 16-32 (No. 3)..... —
Envp. Mla. (Prices based on large sheets untrimmed ream marked, in bdls.)..... —

Wrapp. Mla. 35 lb. up—
No. 1..... —
No. 2..... —

M.G. Sulphite and Kraft (other than Waxing)
Grade B-20 lb..... —
Grade A-22 lb..... —

ROGERS CC-3
Slitter Grinder for FAST Grinding of Circular Knives and Slitters



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◆ BENCH MODEL

The CC-3 is the only machine of its kind made to grind all types of circular knives and both top and bottom slitters with diameters of 2" to 20". The grinding head motor is easily adjusted for accurately grinding any desired bevel or square edge. Wet grinding is provided for by necessary motor driven pump and coolant tank. A magnetic chuck can be supplied to speed set-up time. Keep your knives and slitters in their original fine cutting condition . . . send the coupon below for further information.

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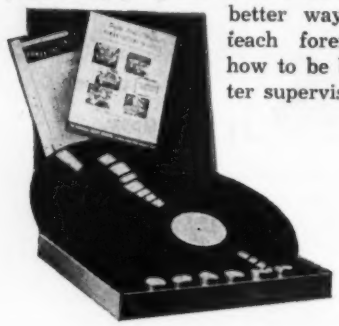
PUT *ACTION* IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.



SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

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1. *Controlled Flow — uniform, positive fibrillation*
2. *Pressurized bedplates*
3. *Absolute control up to 40 tons bedplate pressures*
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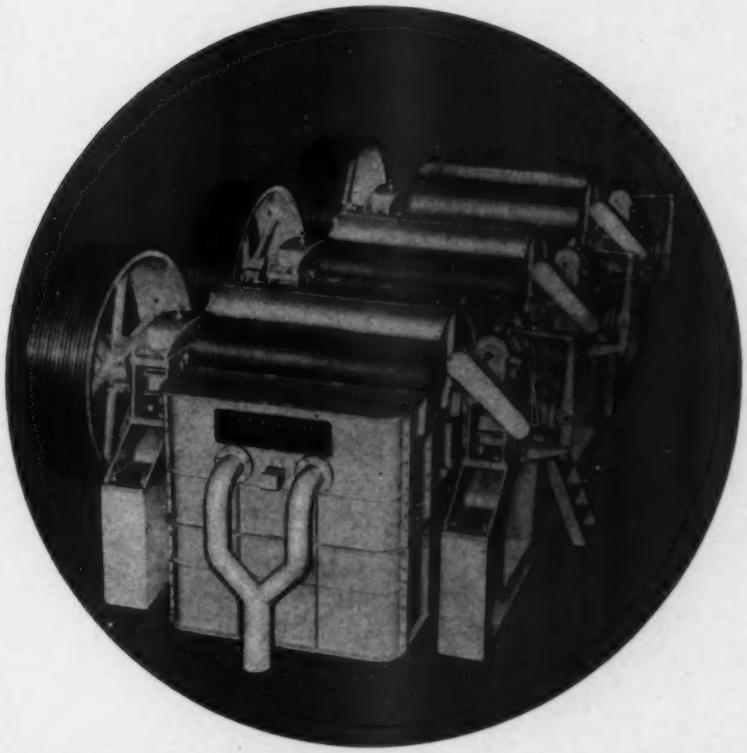

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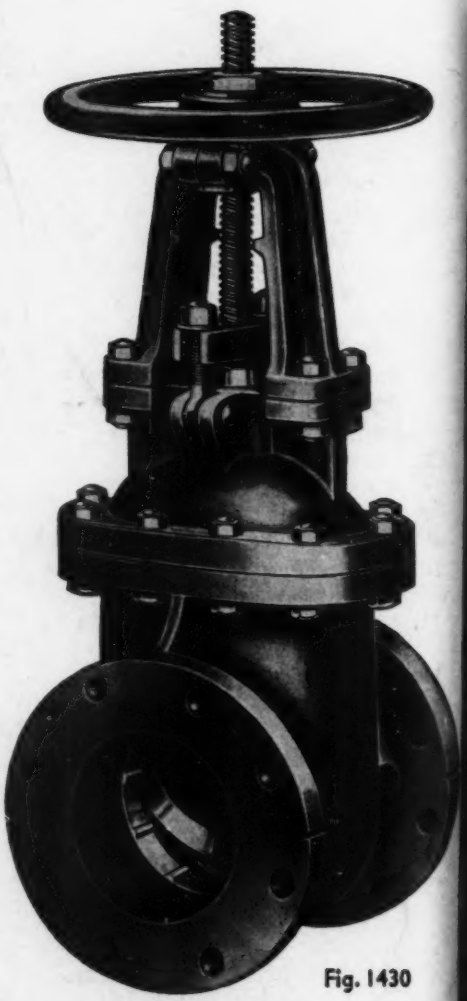

Fig. 1430

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